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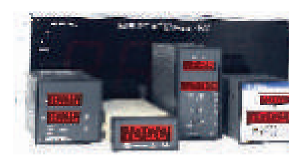
Advanced Automation - Sure Solutions

Podu ct Catalogue 2010

Temperature

Pressure/ Level



Moisture/Gas

Flow

Power

Vibration

PLC

DCS

RTU

SCADA

Protection & Control

Training

Accurate | Dependable | Affordable

masibus

PRODUCT CATALOGUE 2010

Masibus was established in 1975 to manufacture process control instruments in India. Since its inception, Masibus has evolved into a high technology organization with core competencies in process control instrumentation, automation, systems integration & condition monitoring technology.

For over three decades Masibus has scaled unprecedented heights in the design, development & manufacture of microprocessor based instrumentation products and automation solutions.

Masibus'Products, Projects & Condition Monitoring Divisions offer a wide variety of products & customized solutions to its 5000 plus customers, in numerous vertical segments. With branch offices across India, an international office in Sharjah and Singapore along with a host of Dealers & System Integrators, Masibus ensures an immediate response to its customers' call.

Masibus believes that its people are the major assets. Masibus' success lies in its human resources - people who conceive and develop products & solutions to meet the market demands & provide the company the winning edge over its competitors.

Masibus' three manufacturing facilities in India produce a complete range of process instrumentation & turnkey automation solutions, which include Calibrators, Indicators, Controllers, Scanners, Remote Terminal Units, Signal Isolators/Converters, Power Meters & Transducers, I/O Modules, HMI/SCADA software products, customized OEM products as well as Control Panels.

Masibus' Projects Division offers complete systems solutions for several vertical segments like oil & gas, water treatment, steel, pharmaceuticals, fertilizers, chemicals, power, cement, paper, etc.

Masibus' Condition Monitoring Division offers products and services in Vibration Monitoring & Infrared Thermography, and is well positioned to offer cost effective and reliable online vibration monitoring systems.

Masibus is pleased to announce the agreement with GE-Enterprise solutions effective Jan'09 for benefit of our customers that includes GE-Digital Energy suite of hardware and software products. By partnering with GE, we are able to offer advanced automation and sure solutions through selection of optional hardware, software, services and industry knowledge and foresight.

Customer care is the underlying theme of the organizational culture. All employees understand that total customer satisfaction is the key to continued success in a highly competitive industry.

Relentless pursuit for advanced automation and sure solutions has enabled Masibus to win the trust of its customers along with many accolades & recognitions.

Committed to ethical dealings with all its stake holders, Masibus is a value-based organization that makes a conscious effort to care for the environment with its offerings, to enhance the lot of students by offering traineeships & to delight its customers with cost effective solutions & value for money.

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ISO 9001 : 2008 UL REGISTERED FIRM 20001843QMS

ANAB ACCREDITED

UKAS QUALITY MANAGEMENT

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Humidity Cum Temperature Transmitter (MODEL HT7S)

Model HT7S transmitter series are designed for highly accurate humidity and temperature measurement for industrial and building automation applications. They are available as wall and duct mounting versions, with current output.

Model HT7S series transmitters provide linear output signals directly proportional to relative humidity and temperature. Ideal for HVAC, building automation, energy management, clean rooms, research laboratories, weather telemetry and many other industrial applications, these units provide high performance in a compact design. The series HT7S provides better than 2% RH accuracy and class A RTD with excellent long term stability. 4-20 mA DC out put signals are provided for remote display, recorder, controller or SCADA.

Two-wire connections allow easy installation directly into air ducts or within a controlled area. The right choice of the filter cap enables usage in harsh environmental conditions.

Model HT7S comes with three variants, one is humidity transmitter, second is humidity transmitter with RTD pt 100 output and third one is humidity cum temperature transmitter. The Model HT7S uses capacitance based sensor for humidity measurement. This sensor is unaffected by high humidity, dust, fog etc.

A rugged weather proof enclosure is available to monitor space humidity and temperature.

Features

- *High Accuracy*
- *Measuring range 0-100 % RH*
- *Linearised analog 4-20 mA signal output (2 wire loop powered)*
- *Interchangeable sensor*
- *Excellent long-term stability*
- *Replaceable humidity sensor assembly*
- *Wide range of models to suit many applications*
- *Class-A RTD Pt 100 sensor used for temperature measurement*

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Humidity Cum Temperature Transmitter (MODEL HT7S)

HARDWARE SPECIFICATIONS	HT7S00	Model HT7S10	Model HT7S11
Relative Humidity			
Working range	0-100 %RH	0-100 %RH	0-100 %RH
Transmitter Output	4-20 mA (two wire)	4-20 mA (two wire)	4-20 mA (two wire)
Accuracy at 25° C	± 2 %RH (0 to 90 %)	± 2 %RH (0 to 90 %)	± 2 %RH (0 to 90 %)
	± 3 %RH (90 to 100 %)	± 3 %RH (90 to 100 %)	± 3 %RH (90 to 100 %)
Hysteresis	± 1.3 %RH of Operating humidity span	± 1.3 %RH of Operating humidity span	± 1.3 %RH of Operating humidity span
Repeatability	± 0.6 %RH	± 0.6 %RH	± 0.6 %RH
Stability	± 1 %RH typical at 50 %RH in 5 years	± 1 %RH typical at 50 %RH in 5 years	± 1 %RH typical at 50 %RH in 5 years
Sensor	Capacitive sensor	Capacitive sensor	Capacitive sensor
Sensor response time	15 sec in slowly moving air at 25 ° C	15 sec in slowly moving air at 25 ° C	15 sec in slowly moving air at 25 ° C
Temperature			
Sensor	--	Passive Pt-100 (Class A) 0 to 50°C	Pt-100 (Class A) 0 to 50°C
Output	--	Pt 100, 3W	4 - 20 mA (two wire)
Accuracy at 25° C	--	± 0.2% of FS	± 0.2% of FS
General			
Supply voltage	20-35 VDC for Resistive Load	20-35 VDC for Resistive Load	20-35 VDC for Resistive Load
4 - 20 mA loading	500 Ω @24 VDC	500 Ω @24 VDC	500 Ω @24 VDC
Electrical connection	Screw terminals max. 2.5 mm2	Screw terminals max. 2.5 mm2	Screw terminals max. 2.5 mm2
Housing	ABS	ABS	ABS
Cable gland	PG 7	PG 7	PG 7
Sensor protection	Sintered bronze filter	Sintered bronze filter	Sintered bronze filter
Temperature range	Working range : 0 to 50°C	Working range : 0 to 50°C	Working range : 0 to 50°C
Mounting	Wall / Surface mounted	Wall / Surface mounted	Wall / Surface mounted
Case dimensions	80 mm (H) x 82 mm (W) x 55 mm (D)	80 mm (H) x 82 mm (W) x 55 mm (D)	80 mm (H) x 82 mm (W) x 55 mm (D)
Weight	300 gms	300 gms	300 gms

ORDERING CODE

HT 7S 00 - Humidity Transmitter

HT 7S 10 - Humidity Transmitter with Pt 100 output

HT 7S 11 - Humidity cum Temperature Transmitter

Doc.ref.CB-2/HT7S/R1/0110

Pressure Switch (Model PSW 3100)

Masibus pressure indicator, transmitter cum switch Model PSW 3100 has built in sensor made of 17-4pH stainless steel material which is compatible with most of process media. This digital pressure switch measures & displays gauge pressure of any range which one has ordered e.g. 0-16 bars. This model can be ordered for any range up to 160 Bar gauge pressure range.

This product is designed for in-situ use in pressure measurement & control. This instrument has one relay output and set value setting is accessible to the user. Being a digital pressure switch, calibration of this unit is quite simple & easy compared to traditional blind pressure switch which drifts frequently and has high hysteresis band. Accuracy of this switch is ±0.25% FS that ensures a tight pressure measurement and narrow hysteresis band.

Optional retransmission output 4-20 mA DC makes this digital pressure switch more powerful and which can be used as pressure transmitter with local display built-in. PSW 3100 is three in one i.e. one can use it as pressure gauge using it's LED display capability as a pressure switch using it's relay operation and as a pressure transmitter using it's retransmission capability. Enclosure protection IP65 allows you to use this digital pressure switch even in hostile industrial environment.

This Model PSW-3100 is used in many industrial applications such as pneumatic line pressure monitoring, lube oil pressure in power station, hydraulic pressure monitoring in material handling plants, water pipe line pressure monitoring application and any general purpose pressure monitoring applications which demands specific requirements which are available in this model. Masibus has developed this model with a very high performance to price ratio to suit most of the industrial pressure monitoring application needs.

Features

- *High Accuracy*
- *3 in 1 Pressure Transmitter - Gauge - Switch*
- *Bright 4 - digit LED display*
- *Pressure range available upto 160 bar*
- *Relay & analog output*
- *Excellent long- term stability*
- *Easy configuration from front keys*
- *Traceable calibration report*

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Pressure Switch (Model PSW 3100)

HARDWARE SPECIFICATIONS	PSW 3100
Process Media	Air, Liquid (Water, oil) compatible with 17-4pH Stainless Steel
Operating Conditions	Under normal condition where there is no inflammable gas or liquid which cause the ignition or explosion.
Mounting	Vertical
Process Connection	1/4" NPT Male
Electrical Connection	Screw type for power and relay output connection that can accept up to 2.5mm^{2}wire.
Cable Gland	PG 7
Pressure Range	0 to 16 bar Gauge Pressure
	Others on request
Max. Allowable Pressure	Two times of the F.S.
Temperature Coefficient	Less than 100ppm/°C
Display	Display type: 3½ digit seven segment LED (Height of LED: 7.62mm)
	Display Resolution: 0.01% F.S.
	Display Unit: Bar or Kg/cm^2
Power Source	90 to 270 V AC / 120 to 385 V DC
Power Consumption	Less than 7 VA
Comparator Output	Relay Output: 230 VAC, 2 A Response: 1 sec
	Hysteresis: 0.5% to 5% of F.S. (Factory Set, Default Setting- 0.5%)
	Relay can be set to NO or NC. (Factory Set, Default Setting- NO)
Retransmission Output	4 - 20mA DC
Accuracy	± 0.2% of FS (Does not include sensor accuracy)
Load	Max. 450O
Response time	< 100 mS
Isolation	1 KV DC for one minute
Indications	
Power On	Red Led
Fuse Fail	Red Led
Relay On	Green Led
Insulation Resistance	Greater than 50M
Insulation to Withstand Voltage	1000VAC for one minute, between supply to internal circuits.
Zero & Span	Trim pot variation ±5% accessible on the Front of the module.
Operating Temperature	0 to 55°C
Operating Humidity Range	Up to 95% RH (non-condensing)
Case Material	ABS plastic enclosure
Enclosure	IP20 with 80mm x 82mm x 85mm
Terminals	IP20, general purpose
Sensor Accuracy	± 0.25% F.S.
Stability	0.1%F.S./Year
Media Operating Temperature	- 40 to 125 °C
Sensor Type	Thin film strain gauge
Weight	Less than 500 gms

ORDERING CODE

Model	Pressure range		AO	
PSW 3100	X		X	
	1	0-10 Bar	N	None
	2	0-16 Bar	1	4-20mA
	3	0-25 Bar		
	4	0-40 Bar		
	5	0-60 Bar		
	6	0-100 Bar		
	7	0-160 Bar		

X - Specify from table

Doc.ref.CB-2/PSW3100/R1/0110

Bar-graph Indicator (Model 40005)

Masibus Model 40005 series provides economical, high visibility 101 segment bar-graph display for popular process signals. The scale measures a full 106mm for exceptional visibility over long distance at wide angle. A units-of-measure window allows the scale to be labeled.

Model 40005 Bar-Graph Indicator is a popular replacement for sight-glass or moving coil mechanical displays. With LEDs, there are no moving parts to wear & tear, visibility is excellent and the cost of maintenance is low. Bar-graph meters are an ideal means to display relative values, with no need to interpret numeric data. They are augmented by 4 digit digital display where absolute value is required.

Model 40005 is available in single channel slim line version and dual channel version. The aesthetically designed indicators display process variable on high resolution (1%) bar and full 4 digit numeric display in engineering units.

Model 40005 is equipped with additional features like transmitter power supply to excite field transmitter, isolated retransmission output for recorder and serial communication on RS 485 over MODBUS RTU protocol for PC based data acquisition and reporting system.

Model 40005 optionally provides two configurable alarm set point per channel with individual relays to annunciate operator for abnormal process condition.

The bar-graph housing is made of metallic enclosure and can be panel mounted also. When panel mounted the front of the display is sealed.

Features

- *Microprocessor based top of range digital bar-graph indicator*
- *Full 4 digit process display & 101 segment bar display*
- *Wide choice of inputs to select*
- *Square root extractor*
- *Fully configurable & programmable by front keypad*
- *Digital calibration*
- *Transmitter Power Supply*
- *Options :*
  - ? *Transmitter power supply*
  - ? *Retransmission output (Isolated)*
  - ? *RS 485 Serial communication*

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Bar-graph Indicator (Model 40005)

TECHNICAL SPECIFICATIONS	40005
Measured Input Signal	
Number of Inputs	1 or 2
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	500 mS
Burn out current	1.2 μA
Measuring current (RTD)	0.166 mA
Input resistance	TC / V : >1 MΩ
Allowable lead-wire resistance	DC input voltage: 1KΩ or less Effect from allowable signal source resistance: 0.01 % / 100Ω or less
Allowable leadwire resistance	15Ω / wire or less Effect from allowable lead wire resistance: 0.66°C / 10Ω or less
Allowable Input Voltage	TC / RTD: ±10V DC
	DC voltage: ±20V DC
Power supply	90 - 270VAC / 24 VDC
Noise Rejection Ratio	
Common Mode	> 100 dB (50 Hz)
Normal Mode	> 50 dB (50 Hz)
Reference junction compensation error	± 2 °C (10 to 55°C)
Applicable standard	ITS-90 or IPTS -68
Response time	
Input to relay o/p	< 5 Sec.
Input to Analog o/p	1 second or less, 63%(10 - 90%)
Resolution	14½ bits
24V DC Loop Power Supply for sensor	24 VDC ± 5% @ 100 mA
Retransmission Output	
Number of outputs	One per channel
Output Signal	4 to 20 mA (Isolated)
On-Load resistance	
For Current O/P	500Ω or Less
Output accuracy	± 0.25 % of span
Output Regulation	0.01% for full load change
Resolution	12 bits
Serial communication	RS 485(Modbus)

TECHNICAL SPECIFICATIONS	40005
Contact Output	
Usage	Alarm O/P
Number of relay contact outputs	Two per channel
Relay contact rating	230 Vac / 2Amp.
Relay Contact terminal	3 (NO, NC, Common)
Display Unit Specefication	
Process Value display	4- digit 7- segment Red LED (0.3")
Parameter display	Same PV display
Status Indicating lamp	Red LED's
Bar Display	
LED Bar	101
Resolution	1%
1st Bottom Bar Display	Under range
Construction/Installation/Wiiring	
Case	General purpose
Case material	MS powder coated with ABS moulded bezel
Case color	Dark Grey
Weight	Approx. 1.2 kg or less for single channel
	Approx. 1.7 kg or less for dual channel
Dimensions (single channel)	36(W) x 144(H) x 245(D) (all in mm)
Panel cut-out	33.5mm(W) X 138.5mm(H)
Dimensions (dual channel)	72(W) x 144(H) x 245(D) (all in mm)
Panel cut-out	68(W) x 138(H) (all in mm)

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	E	-200 to 1000 °C	±(0.1% of FS ± 1 count)
	J	-200 to 1200 °C	±(0.1% of FS ± 1 count)
	K	-200 to 1372 °C	±(0.1% of FS ± 1 count)
	T	-200 to 400 °C	±(0.1% of FS ± 1 count)
	B	450° to 1820 °C	±(0.1% of FS ± 1 count)
	R	0 to 1768 °C	±(0.1% of FS ± 1 count)
	S	0 to 1768 °C	±(0.1% of FS ± 1 count)
RTD	Pt-100	-199.9 to 850.0 °C	±(0.1% of FS ± 1 count)
Linear	0/1-5V	-1999 to 9999	±(0.1% of FS ± 1 count)
	0/4-20mA	-1999 to 9999	±(0.1% of FS ± 1 count)

ORDERING CODE

Model			No. of Input Type		Aux Power Supply		CH1 Display		CH2 Display		Mounting		Auxiliary o/p		
40005	X		X		XX		XX			XX	XX		X	X	X
	S	One	1	E	U1	90-270 VAC		PV	Bar		P0	Panel	Relay	Rx	RS485
	D	Two	2	J	A3	24VDC	RR	Red	Red	RR	W1	Wall-IP55	N	N	N
			3	K			RG	Red	Green	RG			N	N	Y
			4	T			GR	Green	Red	GR			N	Y	N
			5	B			GG	Green	Green	GG			N	Y	Y
			6	R									Y	N	N
			7	S									Y	N	Y
			9	Pt-100, 3W									Y	Y	N
			C	4-20mA									Y	Y	Y
			D	0-20mA											
			E	1-5VDC											
			F	0-5VDC											

X - Specify from table | Y - Yes | N - No | Rx - Retransmission

Doc.ref.CB-2/4005/R2/0110

Indicator (Model 408)

Masibus offers a wide range of process indicators for monitoring process variables such as pressure, temperature, humidity, flow, level etc. Model 408 has a large display which facilitates plant operator to read PV very conveniently from far distance. Model 408 is microprocessor based indicator with high accuracy and has a multiple input selection capability which helps user to maintain common inventory. It is also equipped with field selectable inputs and field scalable ranges for flexible operations.

Explosion-proof and weather-proof housings are also offered as options to the standard panel mount version. Built-in transmitter power supply eliminates the need of additional power supply to excite field transmitter, which makes this model well equipped.

Model 408 uses large size LED of 20mm (0.8") height which facilitates operator to read the process data from long distance and provides clear visibility. This model is powered by 110/230 VAC auxiliary power supply and 24 VDC auxiliary power supply is available as option on request.

It is a low cost high performance indicator which offers high accuracy of ±0.25% of full scale. This model can be used for Pt 100, five different types of thermocouples and four types of linear inputs.

Reliability is ensured by an ISO 9001 approved quality control system. The input is protected from reverse connection and over range inputs.

Model 408 is the first choice of OEM, system integrators and end users.

Features

- *Microprocessor based process indicator*
- *High accuracy*
- *8 selectable input types*
- *4 digit LED display of 20mm (0.8") high*
- *Built-in Transmitter Power Supply*
- *96 x 48mm DIN enclosure*
- *Excellent long-term stability*
- *Easy configuration from front keys*
- *Optional weather proof and flame proof enclosures*

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Indicator (Model 408)

HARDWARE SPECIFICATIONS	408
Measured Input Signal	
Number of Inputs	1
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	500 ms
Burn out detection	Available with TC, 1 to 5VDC, 4 to 20mA
Burn out current	0.5 μA
Measuring current (RTD)	0.1 mA
Input Impedance	V: 1MΩ , TC: 100Ω
Allowable lead-wire resistance	15Ω/ wire or less Effect from allowable lead wire resistance: 0.66°C / 10Ω or less
Allowable Input Voltage	TC / RTD: ±10V DC
	DC voltage: ±20V DC
Noise Rejection Ratio	
Common Mode:	> 120 dB (50 Hz)
Normal Mode:	> 45 dB (50 Hz)
Reference junction compensation error	± 2 °C (0 to 55°C)
Applicable standard	ITS-90 or IPTS - 68
24V DC Loop Power Supply for sensor	24 VDC ±5 % @ 30 mA
Display Unit Specification	
Process Value display	4- digit 7- segment Red LED (0.8")
Display update rate	Continuous
Construction/Installation/Wiiring	
Enclosure	General purpose
Body construction	ABS Plastic
Case color	Black
Weight	Approximately 500 gms
Dimensions	96W x 48H x 160D (all in mm)
Mounting	Panel mount / Grid mount compatible
Panel Cut-out	92(W) x 45(H) (all in mm)
Wiring	2.5 Sq. mm Barrier Terminal
Standard Accessories	2 mounting clamp
Power supply/Isolation	
Power supply	230 VAC (-15% to +10%) @ 50Hz
Power consumption	Less than 10 VA
Isolation resistance	Between power supply terminal and ground terminal, 500V DC 50 MΩ
Isolation Specifications	
Power supply terminal	Isolated from internal circuit.
Ground terminal	Isolated from internal circuit.
Environmental Conditions	
Normal Operating conditions	
Ambient Temperature	0 to 55 deg C
Ambient humidity	20 to 90% RH (non-condensing)
Warm up time	> 45 min

HARDWARE SPECIFICATIONS	408
Storage conditions	
Temperature	0 to 70 deg C
Humidity	20 to 90% RH (non-condensing)
Effect of operating conditions	
Effect of Ambient temperature	For T/C input, ± 0.1% of F.S./ °C or less For Voltage input, ± 0.05% of F.S./ °C or less For RTD input, ± 0.13% of F.S./ °C or less
Effect on power supply flucutation (within rated voltage range)	For anlog input, within ± 0.005 % of F.S./ 10V

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	J	-100 to 1200 °C	± (0.25% of FS ± 1 count)
	K	-100 to 1372 °C	± (0.25% of FS ± 1 count)
	T	-100 to 400 °C	± (0.25% of FS ± 1 count)
	R	0 to 1768 °C	± (0.25% of FS ± 1 count)
	S	0 to 1768 °C	± (0.25% of FS ± 1 count)
RTD	Pt-100 (1 °C)	-199 to 850 °C	± (0.25% of FS ± 1 count)
	Pt-100 (0.1 °C)	-199.9 to 300.0 °C	± (0.25% of FS ± 1 count)
DC Voltage	1-5V	-1999 to 9999	± (0.1% of FS ± 1 count)
	0-5V	-1999 to 9999	± (0.1% of FS ± 1 count)

ORDERING CODE

Model	Input Type		APS		Mounting	
408	X		XX		XX	
	2	J	A1	110Vac	P0	Panel
	3	K	A2	230Vac	W1	Wall-IP55
	4	T	A3	24Vdc	FP	Wall-FLP
	6	R				
	7	S				
	9	Pt-100,3W				
	C	4-20mA				
	D	0-20mA				
	E	1-5Vdc				
	F	0-5Vdc				

X - Specify from table

Doc.ref.CB-2/408/R1/0110

Smart Indicator (Model 409)

Model-409 is a powerful micro-controller based process indicator, designed to accept multiple input types and two programmable set points with individual relays. Model-409 accepts 21 different types of inputs (all industry standard input) which are field configurable, facilitates plant operator to use in any application. Model-409 is easy to operate and configuration is user friendly. CJC compensation for thermocouple input is done through software for higher accuracy. Provision for range setting is provided to restrict usage band for process safety.

Model-409 is equipped with transmitter power supply, two relays, retransmission output and serial communication RS485 as standard, making this model a benchmark product in the international market. Model-409 uses 5 digit LED display to address process flow rate, weighing measurement application with a high accuracy of ±0.1% FS. Model-409 is a stable & rugged indicator, the first choice of OEMs and end users. Model-409 utilizes its unique feature of LED brightness control which enables plant engineers/ operators to adjust intensity of controllers' LED display in order to achieve comfort for eyes.

Digital input facility is available to reset process value logged for min & max value as 'PV Hi' & 'PV Lo'parameters respectively. Importantly this retransmission output is isolated from other input/ output and internal circuit. Model-409 uses SMPS power supply to cover wide range of power supply from 85 to 265 VAC at 50 Hz to survive in industrial power fluctuation conditions.

Model-409 has a powerful watchdog circuit with close monitoring of software loop that ensures the proper instrument operation in case of power spikes that are very common in industrial environment. This model can also be used as single point RTU, using its serial communication data transfer capability through RS485 on MODBUS protocol. Model-409 is packaged in 96(W) x 48(H) x 112(D) mm industrial standard ABS plastic enclosure (panel mounted) with front facia & enclosure rated to general purpose.

Features

- *Micro-controller based advanced process indicating alarm unit*
- *21 selectable input types*
- *LED brightness control*
- *Transmitter Power Supply built-in*
- *Standard serial communication*
- *Digital Input-Reset PV min/max value*
- *Two independent programmable alarm output*
- *Can be used as remote terminal unit (RTU)*
- *Easy configuration front keys*

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Smart Indicator (Model 409)

Technical Details 409

Display

PV	Red LED 5-digit, character size 0.56".
LED	for status indication (Alarm and Tx/Rx)
Operation keys	Escape, Enter, Increment, Decrement.

Input	Type	Range	Accuracy
TC	E	-200.0 to 1000.0 ºC	
	J	-200.0 to 1200.0 ºC	
	K	-200.0 to 1350.0 ºC	
	T	-200.0 to 400.0 ºC	±0.1 %
	B	450.0 to 1800.0 ºC	Of
	R	0.0 to 1750.0 ºC	Full span
	S	0.0 to 1750.0 ºC	± 1 digit
RTD	Pt 100	-200.0 to 850.0 ºC	
DC * Current	4-20 mA	-19999 to 19999	
	0-20 mA		
DC Voltage	0-5 V		
	1-5 V	-1999.9 to 1999.9	
	0-2 V		
	0.4 – 2V		
	± 10V	-199.99 to 199.99	
	0-10 V		
	-10-20mV		
	± 75 mV	-19.999 to 19.999	
	0-75 mV		
Resistance Input	0-400?	-1.9999 to 1.9999	
	0-6000?		

* For DC Current input, 250? shunt resistor (sold separately) must be externally installed.

For DC current and voltage input, scaling is possible and decimal point can be changed.

Burn out current 0.5 uA

Reference Junction compensation error ±2 ºC

Noise Rejection Ratio

Common mode	>100 dB (50Hz)
Normal mode	>40 dB (50Hz)

RTD Allowable lead wire resistance 15 ? or less.

Input Impedance 1M ? (Approx.) for TC, RTD, 0-2V,0. 4-2V,0-75mV, ±75mV,0-400 ?. 220 k? for 0-10V, ±10V 440 k? for 0-5V, 1-5V, 0-6000 ?.

TEMPCO < 100 ppm for input to display <150 ppm for retransmission output.

Input Sampling period 4 Sample/Sec

Alarm

Alarm AL1	Momentary Alarm Condition – high/low/vlow Lamp – on/flash/latch Relay – on/off
Alarm AL2	Momentary Alarm Condition – vhigh/high/low Lamp – on/flash/latch Relay – on/off

Note: The possible combinations are explained in the operational manual.

Re transmission output(Factory set for current or voltage)

DC Current	0 to 20 mA DC, 4 to 20 mA
DC Voltage	0 to 5V DC, 0 to 10 VDC, 1 to 5V. Accuracy ±0.25% of full Span
Load Resistance for current O/P	600 ? or less
Load Resistance for Voltage O/P	2 K? or more

Supply voltage 85 to 265V AC, 50Hz. Optional 18 - 32 VDC available

Power Consumption Max. 10VA

Insulation resistance Between Power supply terminal and ground terminal, 500V DC 50 M?.

Environment

Ambient	0 to 55 ºC.
Humidity	20 to 95% RH (Non-condensing).

Case

Material	ABS Plastic.
Color	Black.

Mounting method Panel mounting.

Dimension 96(W)*48(H)*112(D).

Panel Cutout 92(W)*46(H)

Weight 260 grams (Approx.)

Communication

Communication Interface	Based on EIA RS-485.
Communication method	Half-duplex communication start stop synchronous.
Communication Speed	4800/9600/19200/38400bps selectable by key.
Parity	None.
Communication Protocol	Modbus RTU.
Connectable number of unit	Max.32 unit per host computer.
Communication error detection	CRC check

Contact Input 1-Channel (Isolated) Non- voltage contact input, Maximum reverse voltage 6V, Maximum Forward voltage 50V, Capacity 24V DC, 10mA

Transmitter Power Supply 24V DC ±10% @26mA (±10 % accuracy)

Isolation specification

Measured input terminal - Isolated from other input/output terminals.

24V DC supply for transmitter - Isolated from other input/output terminal and internal circuit.

Retransmission output terminal - Isolated from other input/output terminal and internal circuit

Relay contact output terminal/RS-485 communication terminal/Power supply terminal/Ground terminal - Isolated from other input/output terminal and internal circuit.

ORDERING CODE

Model 409			Retransmission O/p	
409	APS		X	
	A1	85-265 VAC	1	4-20 mA
	A3	18-32 VDC	2	0-20 mA
			3	1-5 VDC
			4	0-5 VDC
			5	0 - 10VDC

Doc.ref.CB-2/409/R2/0110

Indicator (Model 408-2IN)

Masibus' large digit display Model 408-2IN accepts universal process inputs. From these inputs the display can be scaled to remotely read in engineering units. Unregulated transmitter power supply is provided as standard on AC supply models.

For industrial applications demanding large displays while subjected to outdoor elements, high ambient light areas, Masibus offers series of Large Display Indicators in various sizes, where the LED display is visible from a long distance.

Model 408-2IN is micro-controller based design which accepts major industry standard inputs like RTD, thermocouples, mA, V, etc.

Model 408-2IN large digit displays are your flexible solution when a display needs to be viewed over distances as long as 80 feet (25 m). A rule of thumb is that viewing distance in feet is 40 times the digit height in inches, or in metric terms, the viewing distance in meters is digit height in millimeters divided by 2.

Depending on the selected digit size and mounting location, a Model 408-2IN display with normal brightness LEDs can be read across an entire plant floor, keeping the workforce informed of important process values at their work areas, eliminating the need to view from a small computer screen or local control panel.

Model 408-2IN displays are complete functional units, with all the necessary signal conditioning, power supply and display circuitry. Just apply power 230 VAC, connect your input signal, and display your reading. This model is packaged in MS power coated enclosure of size 192(W) x 96(H) x 70(D) in mm which makes it unit rugged & reliable.

Features

- *Microprocessor based large display indicator*
- *High accuracy*
- *8 selectable input types*
- *4 digit LED display of 45mm (1.8") high*
- *Built-in Transmitter Power Supply*
- *192 x 96mm enclosure*
- *Excellent long-term stability*
- *Easy configuration from front keys*
- *Digital calibration*

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Indicator (Model 408-2IN)

HARDWARE SPECIFICATIONS	408-2IN
Measured Input Signal	
Number of Inputs	1
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	250 ms
Burn out detection	Available with TC, 1 to 5VDC, 4 to 20mA
Burn out current	0.5 μA
Measuring current (RTD)	0.1 mA
Input Impedance	TC /mV / V: 1MΩ
Allowable lead-wire resistance	15Ω / wire or less Effect from allowable lead wire resistance: 0.66°C / 10Ω or less
Allowable Input Voltage	TC / RTD: ±10V DC
	DC voltage: ±20V DC
Noise Rejection Ratio	
Common Mode:	> 120 dB (50 Hz)
Normal Mode:	> 45 dB (50 Hz)
Reference junction compensation error	± 1.5 °C (20 to 45°C)
Applicable standard	ITS-90 or IPTS - 68
24V DC Loop Power Supply for sensor	24 VDC ±5 % @ 30 mA
Display Unit Specification	
Process Value display	4- digit 7- segment Red LED (1.8")
Display update rate	250 mS - TC, 400 mS - RTD
Construction/Installation/Wiiring	
Enclosure	General purpose
Body construction	MS Powder coated
Case color	Dark Grey
Weight	Approximately 1 kg
Dimensions	192W x 96H x 70D (all in mm)
Mounting	Panel mount / Grid mount compatible
Panel Cut-out	188(W) x 92(H) (all in mm)
Wiring	2.5 Sq. mm Terminal
Standard Accessories	2 mounting clamp, 250Ω resistor
Power supply/Isolation	
Power supply	230 VAC (-15% to +10%) @ 50Hz
Power consumption	Less than 10 VA
Isolation resistance	Between power supply terminal and ground terminal, 500V DC 50 MΩ
Isolation Specifications	
Measured Input terminal	Isolated from other input terminals.
24V DC Supply for Transmitter	Isolated from other input terminals
Power supply terminal	Isolated from other input terminals and internal circuit.
Ground terminal	Isolated from other input terminals and internal circuit.
Environmental Conditions	
Normal Operating conditions	
Ambient Temperature	0 to 55 deg C
Ambient humidity	20 to 90% RH (non-condensing)
Warm up time	> 45 min

HARDWARE SPECIFICATIONS	408-2IN
Storage conditions	
Temperature	0 to 70 deg C
Humidity	20 to 90% RH (non-condensing)
Effect of operating conditions	
Effect of Ambient temperature	For T/C input, ± 0.1% of F.S./ °C or less
	For Voltage input, ± 0.05% of F.S./ °C or less
	For RTD input, ± 0.13% of F.S./ °C or less
Effect on power supply flucutation (within rated voltage range)	For anlog input, within ± 0.005 % of F.S./ 10V

TABLE 1		Range	Measurement Accuracy
Input Type			
Thermocouples	J	-100 to 1200 °C	± (0.25% of FS ± 1 count)
	K	-100 to 1372 °C	± (0.25% of FS ± 1 count)
	T	-100 to 400 °C	± (0.25% of FS ± 1 count)
	R	0 to 1768 °C	± (0.25% of FS ± 1 count)
	S	0 to 1768 °C	± (0.25% of FS ± 1 count)
TD	Pt-100	-199.9 to 850.0 °C	± (0.25% of FS ± 1 count)
DC Voltage	1-5V	-1999 to 9999	± (0.1% of FS ± 1 count)
	0-5V	-1999 to 9999	± (0.1% of FS ± 1 count)

ORDERING CODE

Model	Input Type		APS		Mounting	
408-2IN	X		XX		XX	
	2	J	A1	110Vac	P0	Panel
	3	K	A2	230Vac		
	4	T				
	6	R				
	7	S				
	9	Pt-100,3W				
	C	4-20mA				
	D	0-20mA				
	E	1-5Vdc				
	F	0-5Vdc				

X - Specify from table

Doc.ref.CB-2/408-2IN/R1/0110

Indicator (Model 405-4IN)

Masibus' large digit display Model 405-4IN accepts universal process inputs. From these inputs the display can be scaled to be remotely read in engineering units. Transmitter power supply is provided as standard function.

Model 405-4IN large digit displays are your flexible solution when a display needs to be viewed over distances as long as 160 feet (50 m). A rule of thumb is that viewing distance in feet is 40 times the digit height in inches, or in metric terms, the viewing distance in meters is digit height in millimeters divided by 2.

Model 405-4IN accepts 18 different types of inputs (all industry standard input types) which are field configurable. Variety of field inputs facilitates plant operator to use this model in any application. The unit is easy to operate and editing is user friendly. It has mainly three operating modes viz. configuration mode, program mode and calibration mode. CJC compensation for thermocouple input is done through software for higher accuracy. Provision for range setting is provided to restrict usage band for process safety.

Model 405-4IN is equipped with transmitter power supply, two relays, field selectable retransmission output and serial communication RS485 as standard, making this model a benchmark product in the international market.

Retransmission output is field configurable which means output signal can be changed as desired from various options available. Importantly this retransmission output is isolated from other input/ output and internal circuit. Model 405-4IN uses SMPS power supply to cover wide range of power supply from 90 to 270 VAC at 50 Hz.

Features

- *Micro-controller based large display with alarm*
- *18 selectable input types*
- *Display in engineering units*
- *Transmitter Power Supply built-in*
- *Standard serial communication*
- *Programmable retransmission output*
- *Two independent programmable alarm output*
- *Digital calibration*
- *Available as Panel/ Wall mounting*

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Indicator (Model 405-4IN)

TECHNICAL SPECIFICATIONS	405-4IN
Measured Input Signal	
Number of Inputs	1
Input Type,Measurement Range & accuracy	As per table 1
Sampling Period	250 ms
Burn out detection	Available with TC, RTD , 0 to 5VDC, 1 to 5VDC, 0 to 75mVDC, ± 75mVDC, 0 to 6 KO, 0 to 400O
Noise Rejection Ratio	
Common Mode:	> 100 dB (50 Hz)
Normal Mode:	> 50 dB (50 Hz)
Reference-junction compensation error	±2 °C (10 to 55°C)
Applicable standard	ITS-90 or IPTS -68
Response time	
Input to relay o/p:	< 4 seconds
Input to Analog o/p:	1 second or less, 63%(10 - 90%)
Resolution:	15 1/2 bits
Transmitter Power Supply	24 VDC ±5% @ 50 mA
Retransmission Output	
Number of output	1 (one)
Output Signal	4 to 20mA / 0 to 20mA / 1 to 5Vdc / 0 to 10 Vdc
Load resistance	
For Current O/P:	600? or less
For Voltage O/P:	2K? or more
Output accuracy	± 0.25 % of span
Contact Output	
Usage:	Alarm O/P
Number of relay contact outputs:	Two
Relay contact rating	230 Vac / 2Amp.
Relay Contact terminal	3 (NO, NC, Common)
Display Specification	
Process Value display:	4- digit 7- segment Red LED (4")
Set Value display unit:	Same PV display
Parameter display:	Same PV display
Status Indicating lamp:	Red LED's
Construction/Installation/Wiiring	
Enclosure	General purpose
Body construction:	Aluminum
Case color	Silver
Weight	Approximately 5 Kg
Dimensions	483W X 177H X 110D (all in mm)
Mounting	Wall mounted (option panel mount)
Wiring	2.5 Sq. mm Terminal
Standard Accessories	2 mounting clamp
Power consumption	Less than 12 VA
Memory backup	EEPROM
Environmental Conditions	
Normal Operating conditions	
Ambient Temperature	0 to 55 °C
Ambient humidity	20 to 90% RH (non-condensing)
Warm up time	> 30 min
Storage conditions	
Temperature	0 to 70 °C
Humidity	20 to 90% RH (non-condensing)
Power supply	90-270 VAC@50Hz
Power consumption	Less than 10VA

FUNCTIONAL SPECIFICATIONS	405-4IN
Communication	
Interface:	
Protocol:	Modbus RTU serial
Standard	RS - 485
Max. communication distance	< 1200 mts. (for 9600 bps)
Communication method	2 wire half duplex
Data frame	N,8,1
Baud rate	2400, 4800, 9600 bps
Max. connectable devices	31
Address range	1 to 255
Special function	
Square root extraction:	Available

Accessory	
Housing	Wall mounted

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	E	-200 to 1000 °C	± (0.1% of FS + 1 count)
	J	-200 to 1200 °C	± (0.1% of FS + 1 count)
	K	-200 to 1372 °C	± (0.1% of FS + 1 count)
	T	-200 to 400 °C	± (0.1% of FS + 1 count)
	B	450 to 1820 °C	± (0.15% of FS, ± 1 count)
	R	0 to 1768 °C	± (0.15% of FS, ±1 count)
	S	0 to 1768 °C	± (0.15% of FS, ±1 count)
RTD	Pt-100	-199.9 to 850.0 °C	± (0.1% of FS + 1 count)
Resistance	?	0 - 400	± (0.1% of FS + 1 count)
	?	0 - 6000	± (0.15% of FS, ±1 count)
DC Voltage	1-5V	-1999 to 9999	± (0.1% of FS + 1 count)
	0-5V	-1999 to 9999	± (0.1% of FS + 1 count)
	0-75mV	-1999 to 9999	± (0.1% of FS + 1 count)
	±75 mV	-1999 to 9999	± (0.1% of FS + 1 count)
	0 to 10 V	-1999 to 9999	± (0.1% of FS + 1 count)

ORDERING CODE

Model	Input Type		Mounting	
405-4IN	X		XX	
	1	E	P0	Panel
	2	J	W0	Wall GP
	3	K		
	4	T		
	5	B		
	6	R		
	7	S		
	9	Pt-100,3W		
	C	4-20mA		
	D	0-20mA		
	E	1-5 VDC		
	F	0-5 VDC		
	G	0-10 VDC		
	R	+/- 75 mV		
	U	0-75 mV		
	V	0-400 Ω		
	W	0-6000 Ω		

X - Specify from table

Doc.ref.CB-2/405-4IN/R2/0110

Flow Indicator Totaliser (Model 1006)

Masibus' Model 1006 is a panel mounted rate totalizer with separate rate and total displays. When connected with a 4/20mA flow transmitter, Model 1006 will display the rate of flow in engineering unit and total flow in the same or different engineering unit. If the loop is disconnected or auxiliary power fail, the displayed total and all programming parameters are stored in non-volatile memory, and are automatically recovered when the loop/auxiliary power is restored.

A selectable square root extractor function enables the output from a differential flow transmitter to be displayed in linear units. This facility can be enabled or disabled from front keys. When fitted with optional alarms, Model 1006 will detect high and low flow rates and can perform simple flow batching operations. The facility to program the batch warning point and end point simplifies the control of batch processes.

The unit has a 4-digit flow rate and a 6-digit batch total/ inventory-total display. If the integrated total exceeds 6 digits, the display rolls to zero and the number of such roll overs is recorded. The displays have floating decimal point position. The unit is also suitable to be used with flow transmitters having frequency output like turbine, PD, magnetic pick-up type of flow elements .

Model 1006 FIT is equipped with additional features like transmitter power supply to excite field transmitter, isolated retransmission output for recorder and serial communication on RS 485 over MODBUS RTU protocol for PC based data acquisition and reporting system.

This model is packaged in 96mm x 96mm x 175mm metallic enclosure with 92mm x 92mm panel cutout size. Model 1006 can also be packaged in weather proof IP 55 or flame proof housing with wall mounting facility.

Features

- *Input selectable from current, voltage & frequency*
- *Square root extractor*
- *Transmitter Power Supply*
- *Separate rate and total displays*
- *6-digit totalizer with password protected resetting*
- *Programmable conversion factor*
- *Options :*
  - ? *Alarm / Batch relay output*
  - ? *Retransmission output (Isolated)*
  - ? *RS 485 serial communication*
  - ? *Weather proof / flame proof enclosure s*

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Flow Indicator Totaliser (Model 1006)

TECHNICAL SPECIFICATIONS	1006
General	
Power Supply	230VAC OR 115VAC +/- 10% @ 50Hz Terminal Selectable, Optional 24V DC
Power Consumption	<10 VA
Operating temperature	0 to 55 °C
Operating humidity	< 95%RH (non condensing)
Warm-up time	10 min
Isolation level	1500V DC
Process Value	
Measurement accuracy	± 0.25% of F.S ± 1Digit - For I/P signal. ± (0.45% of totalised reading + 1Digit) – for Integrated / Batch total.
No. of signals	1(one)
Input specification	Linear 4-20 mA/ 1-5 V DC, 0-20 mA/ 0-5 V DC.
	Frequency 0-10Khz Low level 0 to 1V, High level 5 to 15V
Input impedance	250 Ohms for Current I/P
	20K Ohms for Voltage Input
Polarity protection	Provided
Temperature drift	<0.001%FS/ °C
Digital Input	1 no. (Optional)
Instrument display	ZERO Value upon Input signal open or short connection
Digital Calibration	Front keys
Set value	
Setting method	Instrument keypad
Reset	Through Front Key password protected
Time Base for Totalizer	Programmable (Day / Hr / Min / Sec)
K Factor Function	Yes (Option)
Square root extraction	Yes
Memory/Data storage	Use EEPROM. Data will not be lost when power off, can hold for 10 years
Display	
Type & color	Numeric 7 Segment RED LED
Process Value	0.56" 4 Digit
Integrated (Total) Value	0.56" 6 Digit

TECHNICAL SPECIFICATIONS	1006
Alarm Relays/Comm. Status	2 discrete LEDs
Rate Indication Range	Range programmable 0-9999
Totalizer Range	0-999999
Decimal point	Adjustable
User interface	4 keys in front sealed membrane
Scan time	250 mS
Output	
Flow Alarms (Optional)	2 Relays rated 2A @ 230V AC
Batch Alarms (Optional)	2 Relays rated 2A @ 230V AC
Contact Type	C-NO-NC Single change over
Retransmission output (Opti.)	Isolated 4-20 mA DC @ 500 Ohms
Retransmission accuracy.	(0.25% of FS+1 count)
Transmitter Power Supply	24V DC ±5% @ 50mA
Serial Communication (Optional)	
Baud rate	110-9600 bps, MODBUS, Programmable
Connection	9 Pin D type
Transmission distance	Less than 1200m for RS485
Communication	Slave mode
Application software	Optional
Data pattern	N,8,1
Error correction method	16 bit CRC
Address range	1-99
Physical	
Mounting type	Panel
Bezel size	96mm(W) X 96mm(H)
Cut-out dimension	92mm(W) X 92mm(H)
Depth with terminals	175mm
Weight	Less than 2 Kg
Hazardous classification	Use in safe area / Ex-Proof - Group IIA/IIB
IP Class	Enclosure - IP20
Enclosure type	General purpose MS Powder coated
Protection (Optional)	IP55 or Ex-Proof - Group IIA/IIB
Electrical connection	2.5mm²/ Screwed
Std. accessories	Mounting clamps

ORDERING CODE

Model	Input Type		Aux Power supply		Communication		Mounting		Auxiliary o/p		
1006	X		XX		X		XX		X	X	X
	C	4-20mA	A1	115VAC	N	None	P0	Panel	Flow relay	Batch relay	Retx
	D	0-20mA	A2	230VAC	2	RS485	W1	Wall-IP55	N	N	N
	E	1-5VDC	A3	24VDC			FP	Wall-FLP	N	N	Y
	F	0-5VDC							N	Y	N
	N	0-10 KHz (Lo level)							Y	N	N
	P	0-10 KHz (Hi level)							N	Y	Y
	S	Special range in 0-10KHz*							Y	N	Y
	T	Digital I/p									

X - Specify from table
Y - Yes
N - No

N - No
* - Consult factory

Doc.ref.CB-2/1006/R2/0110

Flow Indicator Totaliser (Model 1008V)

Masibus' Model 1008V is a panel mounted high precision rate totalizer with separate rate and total displays. When connected with a 4/20mA flow transmitter, 1008V will display the rate of flow in engineering unit and total flow in the same or a different engineering unit. If the loop is disconnected or auxiliary power fail, the displayed total and all programming parameters are stored in non-volatile memory, and are automatically recovered when the loop/auxiliary power is restored.

A selectable square root extractor function enables the output from a differential flow transmitter to be displayed in linear units. When fitted with optional alarms, Model 1008V will detect high and low flow rates and can perform simple flow batching operations.

The unit has a 4-digit flow rate and a 8-digit batch total/ inventory-total display. If the integrated total exceeds 8 digits, the display rolls to zero and the number of such roll overs is recorded. The unit is also suitable to be used with flow transmitters having frequency output like turbine, PD, magnetic pick-up type of flow elements.

Model 1008V can be supplied with upto three inputs for compensated mass flow calculation. Advanced algorithm to carry out such compensation for various compressible media like steam, ethylene etc. is provided.

Model 1008V FIT is equipped with additional features like transmitter power supply to excite field transmitter, isolated retransmission output for recorder and serial communication on RS 485 over MODBUS RTU protocol for PC based data acquisition and reporting system.

This model is packaged in 72mm x 144mm x 175mm metallic enclosure and can also be packaged in weather proof IP 55 or flame proof enclosures in wall mounted.

Features

- *Input selectable from current, voltage & frequency*
- *Square root extractor*
- *Advanced algorithm for mass flow calculation*
- *Separate rate and total displays*
- *8-digit totalizer with password protected resetting*
- *Programmable conversion factor*
- *Options :*
  - ? *Alarm &Batch relay output*
  - ? *Retransmission output (Isolated)*
  - ? *RS 485 serial communication*
  - ? *Weather proof / flame proof enclosure*

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Flow Indicator Totaliser (Model 1008V)

TECHNICAL SPECIFICATIONS 1008V

General

Power supply	230VAC OR 110VAC +/- 10% @ 50Hz Terminal Selectable, Optional 24V DC
Power consumption	<10 VA
Operating temperature	0 to 55 °C
Operating humidity	< 95%RH (non condensing)
Warm-up time	10 min
Isolation level	1500V DC

Process value

Measurement accuracy	± 0.25% of F.S ± 1Digit - For I/P signal. ± (0.45% of reading + 1Digit) – for Integrated / Batch total.
No. of signals	1(one) standard 2 & 3 (optional)
Input specification	Linear 4-20 mA/ 1-5 V DC, 0-20 mA/ 0-5 V DC.
	Frequency 0-10Khz Low level 0 to 1V, High level 5 to 15V
Input impedance	250 Ohms for current I/P
	20K Ohms for Voltage Input
Polarity protection	Provided
Temperature drift	<0.001% FS/ °C
Digital Input	1 Nos. (optional)
Instrument display	ZERO Value upon Input signal open or short connection
Calibration	Software (front keys)

Set value

Setting method	Instrument keypad
Reset	Front Key (password protected)
Time Base for Totalizer	Programmable (Day / Hr / Min / Sec)
K Factor Function	Yes (optional)
Square root extraction	Yes
Memory/Data storage	Use EEPROM. Data will not be lost when power off, can hold for 10 years

Display

Type & color	Numeric 7 Segment RED LED
Process Value	0.56" 4 Digit
Total/Int. Value	0.36" 8 Digit

TECHNICAL SPECIFICATIONS 1008V

Alarm Relays/Comm.	6 discrete LEDs Status
Rate Indication Range	Range programmable 0-9999
Totalizing Range	0-99999999
Decimal point	Adjustable
User interface	6 keys in front sealed membrane
Scan Time	250 mS

Output

Flow Alarms (Optional)	2 Relays rated 2A @ 230V AC
Batch Alarms (Optional)	2 Relays rated 2A @ 230V AC
Contact Type	C-NO-NC Single change over
Retransmission	Isolated 4-20 mA DC @ 500 Ohms output (optional)
Retransmission accuracy	(0.1% of FS+1 count)
Transmitter Power Supply	24VDC ±5% @ 50mA

Serial Communication (Optional)

Baud rate	110-9600 bps, MODBUS, programmable
Connection	Terminal (screwed)
Transmission distance	< 1200m
Communication	Slave mode
Application software	Optional
Data pattern	N,8,1
Error correction method	16 bit CRC
Address range	1-99

Physical

Mounting type	Panel,Vertical type
Bezel size	72mm(W) X 144mm(H)
Cut-out dimension	68mm(W) X 140mm(H)
Depth with terminals	175 mm
Weight	Less than 1.5 Kg
Hazardous classification	Use in safe area / Ex-Proof - Group IIA/IIB
IP Class	Enclosure - IP20
Enclosure type	General purpose MS Powder coated
Protection (Optional)	IP55 or Ex-Proof - Group IIA/IIB
Electrical connection	2.5mm^2/ Screwed
Std. accessories	Mounting clamps

ORDERING CODE

Model	Input Type			Aux Power supply		Communication		Mounting		Auxiliary o/p		
1008V	X			XX		X		XX		X	X	X
	1	One	C 4-20mA	A1	110VAC	N	None	P0	Panel	Flow relay	Batch relay	Retx
	2	Two#	D 0-20mA	A2	230VAC	2	RS485	W1	Wall-IP55	N	N	N
	3	Three#	E 1-5VDC	A3	24VDC			FP	Wall-FLP	N	N	Y
			F 0-5VDC							Y	Y	N
			G 0-10VDC							Y	Y	Y
			N 0-10 KHz (Lo level)									
			P 0-10 KHz (Hi level)									
			S Special*									
			T Digital I/p									

X - Specify from table | Y - Yes | N - No | * - consult factory

#No. of 2 & 3 inputs means one input is exclusive for flow input and second and/or third input is from pressure and/or temperature Tx for mass flow calculation application.

Doc.ref.CB-2/1008V/R2/0110

Flow Indicator Totaliser (Model 1008S)

Masibus' Model 1008S is a panel mounted high precision small foot print rate totalizer with separate rate and total displays. When connected with a 4/20mA flow transmitter, 1008S will display the rate of flow in engineering unit and total flow in the same or a different engineering unit. If the loop is disconnected or auxiliary power fail, the displayed total and all programming parameters are stored in non-volatile memory, and are automatically recovered when the loop/auxiliary power is restored.

A selectable square root extractor function enables the output from a differential flow transmitter to be displayed in linear units. When fitted with optional alarms, Model 1008S will detect high and low flow rates and can perform simple flow batching operations.

The unit has a 5-digit flow rate and a 8-digit batch total/ inventory-total display. If the integrated total exceeds 8 digits, the display rolls to zero and the number of such roll overs are recorded. The unit is also suitable to be used with flow transmitters having frequency output like turbine, PD, magnetic pick-up type of flow elements.

Model 1008S FIT is equipped with additional features like transmitter power supply to excite field transmitter, isolated retransmission output for recorder and serial communication on RS 485 over MODBUS RTU protocol for PC based data acquisition and reporting system.

This model is packaged in 96mm x 96mm x 110mm plastic enclosure and can also be packaged in weather proof IP 55 or flame proof enclosures in wall mounted.

Features

- *Input selectable from current, voltage & frequency*
- *Square root extractor*
- *Separate rate and total displays*
- *8-digit totalizer with password protected resetting*
- *Programmable conversion factor*
- *Options :*
  - *Digital Input*
  - *Alarm & Batch relay output*
  - *Retransmission output (Isolated)*
  - *RS 485 serial communication*
  - *Weather proof/ flame proof enclosure*

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Flow Indicator Totaliser (Model 1008S)

TECHNICAL SPECIFICATIONS 1008S

General

Power supply	90 - 255 VAC +/- 10% @ 50Hz
Power consumption	<10 VA
Operating temperature	0 to 55 °C
Operating humidity	< 95%RH (non condensing)
Warm-up time	10 min
Isolation level	1500V DC

Process value

CMRR	> 100dB
NMRR	> 50dB
Measurement accuracy	± 0.25% of F.S ± 1Digit - For I/P signal ± (0.45% of reading + 1Digit) – for Integrated / Batch total
No. of signals	1(one)
Input specification	4-20 mA/ 1-5 V DC, 0-20 mA/ 0-5 V DC.
	Frequency 0-10KHz Low level 0 to 1V, High level 5 to 15V
Input impedance	250 Ohms for current I/P
	20K Ohms for Voltage Input
Polarity protection	Provided
Temperature drift	<0.001% FS/ °C
Digital Input	4 Nos. (optional)
Instrument display	ZERO Value upon Input signal open or short connection
Digital Calibration	Front Keypad

Set value

Setting method	Instrument keypad
Reset	Front Key (password protected)
Time Base for Totalizer	Programmable (Day / Hr / Min / Sec)
K Factor Function	Yes (optional)
Square root extraction	Yes
Memory/Data storage	NVRAM / EEPROM. Data will not be lost when power off, can hold for 10 years

Display

Type & color	Numeric 7 Segment RED LED
Process Value	0.56" 5 Digit
Total/Int. Value	0.4" 8 Digit

TECHNICAL SPECIFICATIONS 1008S

Alarm Relays/Comm. (status display)	6 discrete LEDs
Rate Indication Range	Range programmable 0-20000
Totalizing Range	0-99999999
Decimal point	Adjustable
User interface	4 keys in front sealed membrane
Scan Time	250 mS

Output

Flow Alarms	2 Relays rated 2A @ 230V AC
Batch Alarms	2 Relays rated 2A @ 230V AC
Contact Type	C-NO-NC Single change over
Retransmission	Isolated 4-20 mA DC @ 500 Ohms output (optional)
Retransmission accuracy	(0.25% of FS+1 count)
Transmitter Power Supply	24VDC ±5% @ 50mA

Serial Communication (RS 485)

Baud rate	9600 / 19200 bps, programmable
Protocol	MODBUS
Connection	Terminal (screwed)
Transmission distance	< 1200m
Communication	Slave mode
Data pattern	N,8,1
Error correction method	16 bit CRC
Address range	1-99

Physical

Mounting type	Panel
Bezel size	96mm(W) X 96mm(H)
Cut-out dimension	92mm(W) X 92mm(H)
Depth with terminals	110 mm
Weight	Less than 1.5 Kg
IP Class	Enclosure - IP20
Enclosure type	General purpose ABS plastic.
Protection (Optional)	IP55 or Ex-Proof - Group IIA/IIB
Electrical connection	2.5mm^2 / Screwed
Std. accessories	Mounting clamps

ORDERING CODE

Model	Input Type		Digital Input		APS		Communication		Mounting		Auxiliary o/p		
1008S	X		X		XX		X		XX		X	X	X
	C	4-20mA	N	None	A1	90-255 VAC	N	None	P0	Panel	Flow relay	Batch relay	Retx
	D	0-20mA	Y	Yes	A3	24 VDC	2	RS485	W1	Wall-IP55	N	N	N
	E	1-5VDC							FP	Wall-FLP	N	N	Y
	F	0-5VDC									Y	Y	N
	G	0-10VDC									Y	Y	Y
	N	0-10 KHz (Lo level)											
	P	0-10 KHz (Hi level)											
	S	Special (Consult Factory)											
	T	Digital I/p											

X - Specify from table | Y - Yes | N - No

Doc.ref.CB-2/1008S/R2/0110

Controller (Model 5006H)

Masibus' Model 5006H is a simple, tough, reliable and cost effective and yet a high performance indicating On/Off controller that has two programmable relay outputs. Relays can be configured either for alarm or control purpose. Model 5006H has one 4 digit display for process variable. This large display facilitates plant operator to read process value conveniently even from longer distance.

Control and programming of the unit is performed via the front panel tactile push buttons which click when operated. All the programme functions are contained in easy to understand menus. The front panel is robust, easy to clean, non reflective membrane.

Model 5006H optionally provides transmitter power supply, eliminating the need for an additional power supply to excite field transmitters. Retransmission output can be provided for recording purpose or can work as cost effective signal converter. Serial communication option makes it a smart controller that can communicate with PC, either for remote configuration or data acquisition application.

Model 5006H is truly smart. While many programmable instruments do require hardware access for input type selection and calibration, Model 5006H totally eliminates any hardware access or switch settings by its unique single shot digital calibration technique - all it requires is just a few key strokes at the front panel keyboard. This unique feature enhances maintenance and operational reliability of the instrument.

This model is packaged in 96mm x 48mm x 175mm plastic enclosure and can also be packaged in weather proof IP 55 or flame proof enclosure in wall mounted.

Features

- *Micro-controller based cost-effective indicator/controller*
- *High performance*
- *Digital calibration*
- *Large, 20mm (0.8") Red LED display*
- *Two relay output*
- *On-site configurable and universal*
- *Options :*
  - ? *Transmitter power supply*
  - ? *Retransmission output (Isolated)*
  - ? *RS 485 serial communication*
  - ? *Weather proof / flame proof enclosure*

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Controller (Model 5006H)

TECHNICAL SPECIFICATIONS	5006H
Number of Inputs	1
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	500 mS
Burn out detection	Available
Input Impedance	J, K , T TC : 77K ohms
	R, S TC : 37K ohms
	Voltage : 1.2 M ohms
Allowable Input Voltage	TC / RTD: ±10V DC, Linear: ±20V DC
Noise Rejection Ratio	
Common Mode	> 120 dB (50 Hz)
Normal Mode	> 40 dB (50 Hz)
Reference -junction compensation error	± 2 °C (10 to 55°C)
Response time	
Input to relay o/p	<4 sec
Input to Analog o/p	3.5 second or less, 63% (10 - 90%)
Resolution	14½ bits
Outputs	
24V DC Loop Power Supply for sensor	Optional (24 VDC ± 5% @ 30 mA)
Linear output signal (optional)	Isolated 4 to 20 mA (load 500 O max)
Output accuracy	±0.25% FS (12 bits resolution)
Output regulation	0.02% for full load change
Relay output (usage)	Control /Alarm
Number of relay contact outputs	2 (Two)
Control type	ON-OFF control , Below ON set point / Above ON set point For heating / cooling
Alarm Types	Below ON set point/Above ON set point
Relay contact rating	230 Vac / 2Amp. (NO, NC, Common)
Serial communication (optional)	RS 485 MODBUS, on terminal
Baud rate	4800, 9600, 19200 bps, selectable
Data pattern	N, 8, 1 (distance max. 1200m)
Display Specification	
Process Value display	4- digit 7- segment Red LED (0.8")
Set Value / parameter display	Same PV display
Status Indicating lamp	Red LED's
Operation keys	INC, DEC(increase / decrease set points or various parameters)
	SET 1 (sets setpoint data or switches various parameters.)
Construction/Installation/Wiiring	
Enclosure	General purpose
Body construction	Poly-carbonet Plastic
Case color	Dark Grey
Weight	Less than 1 Kg
Dimensions	96W X 48H X 175D (all in mm)
Panel Cut-out	92(W) X 45(H) (all in mm)
Wiring	2.5 sq.mm
Standard Accessories	2 mounting clamp
Power supply/Isolation	
Power supply	110/230 VAC ±10%, 50Hz
Power consumption	< 10 VA

TECHNICAL SPECIFICATIONS	5006H
Memory backup	EEPROM
Isolation resistance	Between power supply terminal and ground terminal, 500V DC, 200 MO
Environmental Conditions	
Normal Operating conditions:	
Ambient Temperature:	0 to 55 ºC
Ambient humidity	< 95 % RH (Non-condensing)
Effect of Ambient temperature	For T/C input, ± 0.015% of FS/ °C
	For linear input, ± 0.021% of FS/ °C
	For RTD input, ± 0.025% of FS/ °C
	For analog output, ± 0.02% of FS/ °C
Effect on power supply fluctuation (within rated voltage range)	For analog input, within ± 0.005 % of FS/ 10V
	For analog output, ± 0.01% of FS/ 10V

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	J	-100 to 1200 °C	± (0.25% of FS ± 1 count)
	K	-100 to 1372 °C	± (0.25% of FS ± 1 count)
	T	-100 to 400 °C	± (0.25% of FS ± 1 count)
	R	0 to 1768 °C	± (0.25% of FS ± 1 count)
	S	0 to 1768 °C	± (0.25% of FS ± 1 count)
RTD	Pt-100	-200 to 850 °C	± (0.25% of FS ± 1 count)
		-100.0 to 300.0 °C	± (0.25% of FS ± 1 count)
Linear	0/1-5V	-1999 to 9999	± (0.1% of FS ± 1 count)
	0/4-20mA	-1999 to 9999	± (0.1% of FS ± 1 count)

ORDERING CODE

Model 5006H

Input Type		APS		Mounting		Aux output	
X		XX		XX		X	
1	J	A1	110VAC	P0	Panel	N	None
2	K	A2	230VAC	W1	Wall-IP55	1	4-20 mA DC
3	T	A3	24VDC	FP	Wall-FLP	2	TPS - 24VDC @ 30mA
4	R					3	RS485
5	S						
6	Pt-100, 3W						
C	4-20mA						
D	0-20mA						
E	1-5VDC						
F	0-5VDC						

X - Specify from table

Doc.ref.CB-2/5006H/R2/0110

Process Controller (Model 5006)

Masibus' Model 5006 is a simple, tough, reliable , cost effective yet a high performance indicating On/Off controller with dual programmable relay output version design to meet OEM / Panel manufacturers requirement. Relays can be configured either for alarm or control purpose. Model 5006 has one 4 digit display for process variable.

Control and programming of the unit is performed via the front panel tactile push buttons which click when operated. All the programme functions are contained in easy to understand menus. The front panel is robust, easy to clean, non reflective membrane.

Model 5006 optionally provides transmitter power supply eliminating the need for an additional power supply to excite field transmitters. Retransmission output can be provided for recording purpose or can work as cost effective signal converter. Serial communication option makes it a smart controller that can communicate with PC either for remote configuration or data acquisition application.

Model 5006 is truly smart. While many programmable instruments do require hardware access for input type selection and calibration, Model 5006 totally eliminates any hardware access or switch settings by its unique single shot digital calibration technique - all it requires is just a few key strokes at the front panel keyboard. This unique feature enhances maintenance and operational reliability of the instrument.

This model is packaged in 96mm x 96mm x 120mm plastic enclosure and can also be packaged in weather proof IP 55 or flame proof enclosures in wall mounted.

Features

- *Micro-controller based cost-effective indicator/controller*
- *High performance*
- *Digital calibration*
- *Dual relay output*
- *Dust protected tactile keys*
- *On-site configurable and universal*
- *Options :*
  - ? *Transmitter power supply*
  - ? *Retransmission output (Isolated)*
  - ? *RS 485 serial communication*
  - ? *Weather proof / flame proof enclosure*

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Process Controller (Model 5006)

TECHNICAL SPECIFICATIONS	5006
Number of Inputs	1
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	500 mS
Burn out detection	Available
Input Impedance	J, K , T TC : 77K ohms
	R, S TC : 37K ohms
	Voltage : 1.2 M ohms
Allowable Input Voltage	TC / RTD: ±10V DC, Linear: ±20V DC
Noise Rejection Ratio	
Common Mode	> 120 dB (50 Hz)
Normal Mode	> 40 dB (50 Hz)
Reference-junction compensation error	± 2 °C (10 to 55 °C)
Response time	
Input to relay o/p	<4 sec
Input to Analog o/p	3.5 second or less, 63% (10 - 90%)
Resolution	14½ bits
Outputs	
24V DC Loop Power Supply for sensor	Optional (24 VDC ± 5% @ 30 mA)
Linear output signal (optional)	Isolated 4 to 20 mA (load > 500O)
Output accuracy	±0.25% FS (12 bits resolution)
Output regulation	0.02% for full load change
Relay output (usage)	Control /Alarm
Number of relay contact outputs	2 (two)
Control type	ON-OFF control , Below ON set point / Above ON set point For heating / cooling
Alarm Types	Below ON set point/Above ON set point
Relay contact rating	230 Vac / 2Amp. (NO, NC, Common)
Serial communication (optional)	RS 485 MODBUS, on terminal
Baud rate	4800, 9600, 19200 bps, selectable
Data pattern	N, 8, 1 (distance max. 1200m)
Display Specification	
Process Value display	4- digit 7- segment Red LED (0.56")
Set Value / parameter display	Same PV display
Status Indicating lamp	Red LED's
Operation keys	INC, DEC(increase / decrease set points or various parameters)
	SET 1 (sets setpoint data or switches various parameters.)
Construction/Installation/Wiiring	
Enclosure	General purpose
Body construction	Poly-carbonet Plastic
Case color	Dark Grey
Weight	Less than 1 Kg
Dimensions	96W X 96H X 120D (all in mm)
Panel Cut-out	92(W) X 92(H) (all in mm)
Wiring	2.5 sq.mm
Standard Accessories	2 mounting clamp
Power supply/Isolation	
Power supply	110/230 VAC ±10%, 50Hz
Power consumption	< 8 VA

TECHNICAL SPECIFICATIONS	5006
Memory backup	EEPROM
Isolation resistance	Between power supply terminal and ground terminal, 500V DC, 200 MO
Environmental Conditions	
Ambient Temperature:	0 to 55 ºC
Ambient humidity	< 95 % RH (Non-condensing)
Effect of Ambient temperature	For T/C input, ± 0.015% of FS/ °C
	For linear input, ± 0.021% of FS/ °C
	For RTD input, ± 0.025% of FS/ °C
	For analog output, ± 0.02% of FS/ °C
Effect on power supply fluctuation (within rated voltage range)	For analog input, within ± 0.005 % of FS/ 10V
	For analog output, ± 0.01% of FS/ 10V

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	J	-100 to 1200 °C	± (0.25% of FS ± 1 count)
	K	-100 to 1372 °C	± (0.25% of FS ± 1 count)
	T	-100 to 400 °C	± (0.25% of FS ± 1 count)
	R	0 to 1768 °C	± (0.25% of FS ± 1 count)
	S	0 to 1768 °C	± (0.25% of FS ± 1 count)
RTD	Pt-100	-200 to 850 °C	± (0.25% of FS ± 1 count)
		-100.0 to 300.0 °C	± (0.25% of FS ± 1 count)
Linear	0/1-5V	-1999 to 9999	± (0.1% of FS ± 1 count)
	0/4-20mA	-1999 to 9999	± (0.1% of FS ± 1 count)

ORDERING CODE

Model 5006

Input Type		APS		Mounting		Aux output	
X		XX		XX		X	
1	J	A1	110VAC	P0	Panel	N	None
2	K	A2	230VAC	W1	Wall-IP55	1	4-20 mA DC
3	T	A3	24VDC	FP	Wall-FLP	2	TPS - 24VDC
4	R					3	RS485
5	S						
6	Pt-100, 3W						
C	4-20mA						
D	0-20mA						
E	1-5VDC						
F	0-5VDC						

X - Specify from table

Doc.ref.CB-2/5006/R2/0110

Process Controller (Model 5007)

Masibus' Model 5007 is the most industry popularhigh performance indicating On/Off controller having dual display for PV and SV. Model 5007 is available in dual programmable relay output version to suit OEM / Panel manufacturers requirement as much as it meets the end user needs. Relays can be configured either for alarm or control purpose. Model 5007 has two 4 digit display.

Control and programming of the unit is performed via the front panel tactile push buttons which clicks when operated. All the programme functions are contained in easy to understand menus. The front panel is robust, easy to clean, non reflective membrane.

Model 5007 optionally provides transmitter power supply eliminating the need for an additional power supply to excite field transmitters. Retransmission output can be provided for recording purpose or can work as cost effective signal converter. Serial communication option makes it a smart controller that can communicate with PC either for remote configuration or data acquisition application.

Model 5007 is truly smart. While many programmable instruments do require hardware access for input type selection and calibration, Model 5007 totally eliminates any hardware access or switch settings by its unique single shot digital calibration technique - all it requires is just a few key strokes at the front panel keyboard. This unique feature enhances maintenance and operational reliability of the instrument.

This model is packaged in 96mm x 96mm x 120mm plastic enclosure and can also be packaged in weather proof IP 55 or flame proof enclosures in wall mounted.

Features

- *Micro-controller based cost-effective dual display controller*
- *Field selectable universal input*
- *Digital calibration*
- *Dual relay output*
- *Dust protected tactile keys*
- *On-site configurable*
- *Options :*
  - ? *Transmitter power supply*
  - ? *Retransmission output (Isolated)*
  - ? *RS 485 serial communication*
  - ? *Weather proof / flame proof enclosure*

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Process Controller (Model 5007)

TECHNICAL SPECIFICATIONS	5007
Number of Inputs	1
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	500 mS
Burn out detection	Available
Input Impedance	J, K , T TC : 77K ohms
	R, S TC : 37K ohms
	Voltage : 1.2 M ohms
Allowable Input Voltage	TC / RTD: ±10V DC, Linear: ±20V DC
Noise Rejection Ratio	
Common Mode	> 120 dB (50 Hz)
Normal Mode	> 40 dB (50 Hz)
Reference-junction compensation error	± 2 °C (10 to 55 °C)
Response time	
Input to relay o/p	<4 sec
Input to Analog o/p	3.5 second or less, 63% (10 - 90%)
Resolution	14½ bits
Outputs	
24V DC Loop Power Supply for sensor	Optional (24 VDC ± 5% @ 30 mA)
Linear output signal (optional)	Isolated 4 to 20 mA (load > 500O)
Output accuracy	±0.25% FS (12 bits resolution)
Output regulation	0.02% for full load change
Relay output (usage)	Control /Alarm
Number of relay contact outputs	2 (two)
Control type	ON-OFF control , Below ON set point / Above ON set point For heating / cooling
Alarm Types	Below ON set point/Above ON set point
Relay contact rating	230 Vac / 2Amp. (NO, NC, Common)
Serial communication (optional)	RS 485 MODBUS, on terminal
Baud rate	4800, 9600, 19200 bps, selectable
Data pattern	N, 8, 1 (distance max. 1200m)
Display Specification	
Process Value display	4- digit 7- segment Red LED (0.56")
Set Value / parameter display	4 digit 7 - segment Red LED (0.28")
Status Indicating lamp	Red LED's
Operation keys	INC, DEC(increase / decrease set points or various parameters)
	SET 1 (sets setpoint data or switches various parameters.)
Construction/Installation/Wiiring	
Enclosure	General purpose
Body construction	Poly-carbonet Plastic
Case color	Dark Grey
Weight	Less than 1 Kg
Dimensions	96W X 96H X 120D (all in mm)
Panel Cut-out	92(W) X 92(H) (all in mm)
Wiring	2.5 sq.mm
Standard Accessories	2 mounting clamp
Power supply/Isolation	
Power supply	110/230 VAC ±10%, 50Hz
Power consumption	< 8 VA

TECHNICAL SPECIFICATIONS	5007
Memory backup	EEPROM
Isolation resistance	Between power supply terminal and ground terminal, 500V DC, 200 MO
Environmental Conditions	
Ambient Temperature:	0 to 55 ºC
Ambient humidity	< 95 % RH (Non-condensing)
Effect of Ambient temperature	For T/C input, ± 0.015% of FS/ °C
	For linear input, ± 0.021% of FS/ °C
	For RTD input, ± 0.025% of FS/ °C
	For analog output, ± 0.02% of FS/ °C
Effect on power supply fluctuation (within rated voltage range)	For analog input, within ± 0.005 % of FS/ 10V
	For analog output, ± 0.01% of FS/ 10V

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	J	-100 to 1200 °C	± (0.25% of FS ± 1 count)
	K	-100 to 1372 °C	± (0.25% of FS ± 1 count)
	T	-100 to 400 °C	± (0.25% of FS ± 1 count)
	R	0 to 1768 °C	± (0.25% of FS ± 1 count)
	S	0 to 1768 °C	± (0.25% of FS ± 1 count)
RTD	Pt-100	-200 to 850 °C	± (0.25% of FS ± 1 count)
		-100.0 to 300.0 °C	± (0.25% of FS ± 1 count)
Linear	0/1-5V	-1999 to 9999	± (0.1% of FS ± 1 count)
	0/4-20mA	-1999 to 9999	± (0.1% of FS ± 1 count)

ORDERING CODE

Model 5007

Input Type		APS		Mounting		Aux output	
X		XX		XX		X	
1	J	A1	110VAC	P0	Panel	N	None
2	K	A2	230VAC	W1	Wall-IP55	1	4-20 mA DC
3	T	A3	24VDC	FP	Wall-FLP	2	TPS - 24VDC
4	R					3	RS485
5	S						
6	Pt-100, 3W						
C	4-20mA						
D	0-20mA						
E	1-5VDC						
F	0-5VDC						

X - Specify from table

Doc.ref.CB-2/5007/R2/0110

On-Off Temperature Controller (Model LC 5248)

Masibus' Model LC5248 is the most industry popular high performance indicating On/Off controller having dual display for PV and SV. Model LC5248 is available in dual programmable relay output version to suit OEM / Panel manufacturers requirement as much as it meets the end user needs. Relays can be configured either for alarm or control purpose. Model LC5248 has two 4 digit display.

This model is manufactured with special designed 18 bit A to D convertor for high resolution measurement. (0.1°C resolution for thermocouple and Pt100). This technology provides improved operating performance, low cost, enhanced reliability and higher stability.

Masibus introduced a unique feature of LED brightness adjustment in this controller which enables plant engineers/ operators to adjust intensity of controllers' LED display in order to achieve comfort for eyes.

Control and programming of the unit is performed via the front panel tactile push buttons which clicks when operated. All the programme functions are contained in easy to understand menus. The front panel is robust, easy to clean, non reflective membrane.

Model LC5248 is truly smart. While many programmable instruments do require hardware access for input type selection and calibration, Model LC5248 totally eliminates any hardware access or switch settings by its unique digital calibration technique - all it requires is just a few key strokes at the front panel keyboard. This unique feature enhances maintenance and operational reliability of the instrument.

This model is packaged in 48mm x 48mm x 77mm plastic enclosure .

Features

- *High performance with low cost*
- *Easy to use*
- *Universal Input*
- *Micro-controller based cost-effective dual display controller*
- *LED brightness control*
- *Field selectable universal input*
- *Digital calibration*
- *Two relay output*
- *Dust protected tactile keys*
- *On-site configurable*
- *48 X 48 mm bezel size*

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On-Off Temperature Controller (Model LC 5248)

TECHNICAL SPECIFICATION	LC 5248
Number of Inputs	1
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	250 mS
Burn out detection	0.5 μA
Input Impedance	>1 M ohms
Noise Rejection Ratio	
Common Mode	> 120 dB (50 Hz)
Normal Mode	> 40 dB (50 Hz)
Reference-junction compensation error	± 2 °C (0 to 55 °C)
Response time	
Input to relay o/p	<1 sec
Resolution (A to D convertor)	18 bits
Outputs	
Relay output (usage)	Control
Number of relay contact outputs	2 (two)
Control type	ON-OFF control , Below ON set point / Above ON set point
Relay contact rating	230 Vac / 2Amp. (NO or NC, Common)
Display Specification	
Process Value display	4- digit 7- segment Red LED (0.4")
Set Value / parameter display	4 digit 7 - segment Green LED (0.28")
Status Indicating lamp	Red LED's
Operation keys	INC, DEC(increase / decrease set points or various parameters),ENT
Construction/Installation/Wiiring	
Enclosure	General purpose
Body construction	Poly-carbonet Plastic
Case color	Black
Weight	120 gms.
Dimensions	48W X 48H X 77D (all in mm)
Panel Cut-out	45(W) X 45(H) (all in mm)
Wiring	2.5 sq.mm
Standard Accessories	2 mounting clamp
Power supply/Isolation	
Power supply	85- 265 VAC @50Hz/ 120-290 VDC
	18- 36 VDC (Optional)
Power consumption	< 5 VA
Memory backup	EEPROM
Isolation resistance	Between power supply terminal and ground terminal, 500V DC, 200 MO
Environmental Conditions	
Ambient Temperature:	0 to 55 ºC
Ambient humidity	Upto 95 % RH (Non-condensing)
Storage temperature	0 - 80 ºC

TECHNICAL SPECIFICATIONS	LC 5248
Die electric strength	1) 1.5KV AC between AC supply & i/p AC supply for 1 minute 2) 1.5 KV AC between AC supply and Relay-1 contact for 1 minute. 3) 1.5KV AC between AC supply and Relay-2 contact for 1 minute. 4) 1.5 KV AC between Input and Relay-1 contact for 1 minute 5) 1.5 KV AC between Input and Relay-2 contact for 1 minute
LED Brightness Control	Availbale

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	J(W/1°C)	-200 to 1200 °C	± (0.25% of FS ± 1 degree)
	J(W/0.1°C)	-199.9 to 999.9°C	± (0.25% of FS ± 1 degree)
	K (W/1°C)	-200 to 1372 °C	± (0.25% of FS ± 1 degree)
	K (W/0.1°C)	-199.9 to 999.9 °C	± (0.25% of FS ± 1 degree)
RTD	Pt-100	-200 to 850 °C	± (0.25% of FS ± 1 degree)
		-199.9 to 850.0 °C	± (0.25% of FS ± 1 degree)
Linear	4-20mA/ 1-5V	-1999 to 9999	± (o.25% of FS ± 1 count)
	0-20mA/ 0-5V	-1999 to 9999	± (o.25% of FS ± 1 count)

ORDERING CODE

Model LC 5248			
Input Type		APS	
X		XX	
1	J (W/1°C)	U1	85- 265 VAC
2	J (W/0.1°C)	U2	18- 36 VDC
3	K (W/1°C)		
4	K (W/0.1°C)		
9	Pt-100, 3W		
C	4-20mA		
D	0-20mA		
E	1-5VDC		
F	0-5VDC		

X - Specify from table

Doc.ref.CB-2/LC5248/R1/0110

Digital Controller (Model 5002U)

Masibus leads the temperature controller market within the country with its wide range of manufacturing products. Model 5002U is Masibus' flagship product designed for versatile industrial applications and is the most popular product.

Model 5002U is a microprocessor based premium range of ON/OFF controller designed with high performance to price ratio. This model is the most stable & reliable amongst all the controllers available in the market today.

Model 5002U can be field programmed to accept inputs from wide range of thermocouples, RTDs current or voltage signals. The controller is truly universal. When thermocouple input is selected cold junction compensation is carried out automatically, whereas if RTD is selected, lead wire resistance cancellation is carried out. Masibus has developed and embedded in Model 5002U a unique one-shot, calibration algorithm which calibrates the input type in one-shot (avoiding iterative procedure) when ever input type is changed.

The programming, calibration and operation are by four keys with user friendly prompts. One LED display for PV & second display for SP make this model the first choice of OEMs & plant operators.

Provision for external data lock out is provided to avoid unauthorized access. 5002U is equipped with upto four set points with individual relays. Transmitter power supply, retransmission signal and serial communication on RS485 are additional useful options. The zero and span of the retransmission signal automatically aligns itself with the zero and span selected for the digital display.

This model is packaged in 96mm x 96mm x 200mm metalic enclosure and can also be packaged in weather proof IP 55 or flame proof enclosures in wall mounted options.

Features

- *Premium On/Off controller for versatile operation*
- *High accuracy of 0.1% FS*
- *Unique one shot CAL algorithm*
- *Universal inputs- T/C, RTD, mA, V*
- *Upto 4 independent programmable relay output*
- *Full programming by front panel keys*
- *Options :*
  - ? *Transmitter power supply*
  - ? *Retransmission output (Isolated)*
  - ? *RS 485 Serial communication*
  - ? *Weather proof / flame proof enclosure*

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Digital Controller (Model 5002U)

TECHNICAL SPECIFICATIONS	5002U
Measured Input Signal	
Number of Inputs	1
Input Type, Measurement Range & accuracy	As per table 1
Sampling Period	300 mS
Burn out detection	Available
Input Resistance	TC /mV / V: 100 K ohms
	mA : 250?
Allowable lead-wire resistance	15? / wire or less
Allowable Input Voltage	TC / RTD: ±10V, DC voltage: ±20V
Common mode rejection ratio (CMRR)	> 120 dB (50 Hz)
Normal mode rejection ratio (NMRR)	> 40 dB (50 Hz)
CJC error	±2 °C (10 to 55°C)
Applicable standard	ITS-90 / IPTS -68
Outputs	
Transmitter power supply	24 VDC ± 5% @ 20 mA
Retransmission output	4 to 20 mA (< 250Ω)
Retransmission accuracy	± 0.25% of Span
Relay Output	2, 3, 4 (configurable for control / alarm)
Alarm Types	Absolute / Deviation Alarm ON above / below set point
Relay contact rating	230 Vac @ 2Amp (NO, NC, Common)
Display & keyboard specification	
Process Value display	4- digit 7- segment Red LED (0.56")
Set Value display	4- digit 7- segment Red LED (0.3")
Parameter display	Same PV display
Status Indicating lamp	Red LED's (for Alarm, Set point & Communication)
Keyboard	INC, DEC, SET, ENT (tactile keys)
Physical	
Case	General purpose
Case material	MS powder coated (ABS Plastic Bezel)
Case color	Dark Grey
Weight	Less than 2 Kg
Dimensions	96(W) X 96(H) X 200(D) (all in mm)
Panel Cut-out	92 mm X 92 mm
Wiring	Cable wire upto 2.5 mm^2
Standard Accessories	2 mounting clamps
Power supply/Isolation	
Power supply	110/230 VAC(±10%) @ 50Hz
Power consumption	< 10 VA
Memory backup	EEPROM
Isolation	Between Input, output, power supply
Isolation resistance	Between power supply terminal and ground terminal, 500V DC, 50 MΩ
Environmental Specification	
Ambient Temperature	0 to 55 ºC
Ambient humidity	< 95 % RH (Non-condensing)

TECHNICAL SPECIFICATIONS	5002U
Effect of Ambient temperature	For T/C input, ± 0.01% of F.S./ °C
	For Voltage input, ± 0.01% of F.S./ °C
	For RTD input, ± 0.01% of F.S./ °C
	For analog output, ± 0.03% of F.S./ °C
Effect on power supply fluctuation	For analog input, within ± 0.005 % of F.S./ 10V
(within rated voltage range)	For analog output, ± 0.01% of F.S./ 10V
Communication	
Standard / Protocol	RS-485, Modbus RTU
Max. communication distance	< 1200 mts. (for 9600 bps)
Communication method	2 wire half duplex (slave mode)
Data frame	N, 8, 2
Communication rate	4800, 9600, 19200 bps programmable

TABLE 1

Input Type		Range	Measurement Accuracy
Thermocouples	E	-200 to 1000 °C	± (0.1% of FS ± 1 count)
	J	-200 to 1200 °C	± (0.1% of FS ± 1 count)
	K	-200 to 1372 °C	± (0.1% of FS ± 1 count)
	T	-200 to 400 °C	± (0.1% of FS ± 1 count)
	B	100 to 1820 °C	± (0.1% of FS ± 1 count)
	R	0 to 1768 °C	± (0.1% of FS ± 1 count)
	S	0 to 1768 °C	± (0.1% of FS ± 1 count)
	N	-200 to 1300 °C	± (0.1% of FS ± 1 count)
RTD	Pt-100	-199.9 to 850.0 °C	± (0.1% of FS ± 1 count)
Linear	0/4-20mA	-1999 to 9999	± (0.1% of FS ± 1 count)
	0/1-5V	-1999 to 9999	± (0.1% of FS ± 1 count)
Oxygen	0-1999mV	Oxygen probe	± (0.1% of FS ± 1 count)

ORDERING CODE

Model 5002U

Input Type		Relay		APS		Aux output		Mounting	
X		X		XX		X		XX	
1	E	S	One	A1	110VAC	N	None	P0	Panel
2	J	D	Two	A2	230VAC	1	4-20 mA	W1	Wall-IP55
3	K	T	Three*	A3	24VDC	2	TPS - 24VDC	FP	Wall-FLP
4	T	F	Four ▲			3	RS485		
5	B	N	None			4	TPS & 4-20mA Only with 2 rly		
6	R					5	TPS & RS485 Only with 2 rly		
7	S								
9	Pt-100, 3W								
C	4-20mA								
D	0-20mA								
E	1-5VDC								
F	0-5VDC								
O	Oxygen Probe								
S	Special+								

X - Specify from table
* - A3 option not available
▲ - A3 & FP option not available
+ - Consult factory

Doc.ref.CB-2/5002U/R3/0110

PID Controller (MODEL 5030)

Masibus' Model 5030 is a versatile micro-controller based process PID Controller with a very high performance to price ratio. Model 5030 has powerful hardware capabilities like universal inputs, transmitter powering, remote set-point, terminal embedded cold junction sensor and front keypad for user configuration. The Controller has wide range of control output options to interface with all types of end control element.

Masibus has embedded special function block for pulsed output to motorized valves (MOV) that can work with or without valve position feedback. Slide wire resistance position feedback opens out very often, causing unstable loop; such problems can be avoided using Model 5030 with pulse output without position feedback. Model 5030 has many such special process function blocks.

The input can be programmed for any one of thermocouple types, RTD Pt 100, current or voltage. The control out put is user selectable from linear voltage/ current, heat/cool relays, motorized actuator, pulse output (slow/fast cycle) for SSR.

Transmitter excitation supply, remote options/ features set point input and two independent auxiliary relays are supplied as standard. Configuration, Programming, Operation & Calibration modes are protected by DIP switches. Special digit shift key facilitates quick setting and is unique to the product.

Model 5030 has optional retransmission output for interface to recorder or can provide serial RS 485 communication over MODBUS for PC interface.

Model 5030 has 4 digit display for PV, SV and 20 segment bar display for MV. Even control output can be limited using high or low limit selection.

Features

- *Micro-controller based universal process controller*
- *Wide choice of input & output types*
- *Pulsed output for MOV with/without position feedback*
- *Remote set point input for cascade control*
- *Configurable control parameters*
- *Three-level security*
- *Simultaneous PV, SV, MV display*
- *Isolated retransmission & TPS output*
- *Optional RS 485 communication*

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PID Controller (MODEL 5030)

TECHNICAL SPECIFICATIONS 5030

Display

4 digit 0.56" Red LEDs for process variable.

4 digit 0.39" Red LEDs for set point.

20 segment bargraph for control output / valve position indication.

Individual discrete Red LEDs to indicate relay status, auto/manual mode, Local/Remote set point, Transmit /Receive status in case of serial communication.

Accuracy

± 0.1% of F.S ± 1 Count.

Input

Thermocouple types B, E, J, K, R, S & T (ANSI standard)

RTD Pt 100, 3-wire.

4-20 mA or 1-5V DC linear.

Other types on request.

Input open protection : upscale.

Common Mode Rejection ratio (CMRR) : 120 dB@ 50Hz.

Normal Mode Rejection ratio (NMRR) : 60 dB@ 50Hz.

Input Type		Range
Thermocouple	B	100 to 1820°C
	E	-200 to 1000°C
	J	-200 to 1200°C
	K	-200 to 1372°C
	R	0 to 1768°C
	S	0 to 1768°C
	T	-200 to 400°C
RTD	PT-100 (3 wire)	-199.9 to 850°C
Linear	4 to 20 mA	-1999 to 9999
	0-5V	-1999 to 9999
Remote set-point input	0/4-20 mA	-1999 to 9999

Controls

Set, Digit shift, Increase, Decrease and Enter keys for configuration, operation, programming and calibration. With the Digit shift key individual digit can be directly changed, so data can be changed fast instead of normal increment / decrement keys.

Data access level programmable for operator level and supervisor level by DIP switch at back. Data lock provision by DIP switch at back to avoid unauthorized data access.

Control Parameters

Proportional Band : 1 to 400 (Field Configurable as Absolute, % SP, % SPAN)

Integral time (Reset) : 1 to 1800 seconds. (0-OFF)

Derivative time (Rate): 1 to 600 seconds. (0-OFF).

Special feature of proportional band shift and integral inhibit provided for batch operation application.

Output

Control Output : Field selectable from one of the following -

- Volt / Current (0/4-20mA or 0/1-5V)
- Pulse output (Slow cycle pulse: cycle time 4 sec. / Fast cycle pulse : cycle time 0.4 sec., 12V @12mA)
- Heat / Cool relay : 2 SPDT relays rated at 2A @ 230VAC with hysteresis
- Forward / Reverse relay : 2 SPDT Relays rated 2A @ 230VAC with dead band and with / without potentiometer feedback (motorized actuator interface)
  - i) Resistance feedback - 100Ω to 1000Ω
  - ii) Current feedback - 4-20 mA DC

Two / Three Auxilliary Relays : Front panel configurable for control or Absolute/Deviation alarm. Relays configurable for 'on above' and 'on below'.

Acknowledge facility for alarm.

Transmitter Power Supply : 24VDC @30mA

TECHNICAL SPECIFICATIONS 5030

Retransmission output:4-20mA Isolated @600 ?
(not available if serial communication option selected)

Options

Serial communication :RS 485 with MODBUS RTU protocol.
(not available if retransmission option selected)

Enclosure Explosion proof (Group IIA / IIB)

Calibration

Zero and span of process variable, remote set point and valve position are adjusted by digital calibration through front panel keys. No trim-pots used.

General

Power supply	110V/230V AC ±10%, 50 Hz
Ambient	0 to 55 °C
Humidity	up to 95% RH (non condensing)
Power consumption	Less than 15 VA

Protection

Enclosure	IP20

Physical

Case	M.S. powder coated with ABS molded bezel and membrane key pad.
Terminals	Cable wire up to 2.5 mm^2
Bezel size	96mm x 96mm
Panel cutout	92 x 92 mm
Depth behind panel	220 mm max. Including terminals
Weight	Less than 2.5 Kg

ORDERING CODE

Model 5030

Input Type		Aux output		APS		Control output		Mounting	
X		X		XX		X		XX	
1	E	N	None	A1	110VAC	R	Heat relay	P0	Panel
2	J	3	RS485	A2	230VAC	F	F/R relay with feedback	FP	Wall-FLP
3	K					M	F/R relay without feedback		
4	T					C	4-20 mA DC		
5	B					V	0-5 VDC		
6	R					S	SSR		
7	S								
9	Pt-100, 3W								
C	4-20mA								
D	0-20mA								
E	1-5VDC								
F	0-5VDC								

X - Specify from table

Doc.ref.CB-2/5030/R2/0110

Signal Isolator (Model 9000U - Single/Dual Output)

Masibus Signal Isolator Model 9000U is a rugged 4 wire isolator designed to accept custom-built and wide range of voltage and current input signals. Signal is then isolated and converted to standard instrumentation signals, acceptable to commercially off the shelf (COTS) automation products.

Masibus' Signal Isolator Model 9000U enables analog signals to transmit without galvanic connections between the field and the receiving instrument. This in turn allows ground or reference levels to float up to thousands of volts at its input terminals, and prevents circulating current between differing ground potentials that can contaminate input signal. Model 9000U will isolate the contaminated signal to a clean signal for accurate measurement and control application.

Isolation provided by Masibus Model 9000U saves the control system from damage due to accidental application of high voltage or induced voltages on the input signal and in turn avoids wrong output signals to process. They also act as signal distributors when used with more number of outputs. Model 9000U series is available with multiple outputs up to 2 nos for signal distribution. A typical application could be where the signal has to be distributed for indication on local panel/ field control room/ main control room and DCS system. The Isolator provides a good protection for sensitive system parts against voltage spikes etc.

Model 9000U offers a wide range of input/ output signal types include mA, mV, VDC. Built-in transmitter power supply (TPS) can drive field transmitters in case of 4-20mA DC input. Model 9000U offers excellent accuracy and stability for reliable operation in hostile environments and full isolation safely separates each input channel, each output channel and the power supply.

Features

- *Rugged & accurate 4 wire isolator*
- *Three port isolation*
- *Accepts non-std signal input option*
- *Input:*
  - ? *Voltage ±10mV to ±600VDC*
  - ? *Current ±1mA to ±100mA*
- *Mains/DC operated*
- *Up to 2 outputs of different types available*
- *DIN rail/back panel mounted*
- *Built in transmitter powering*
- *Duplex isolator version option*
- *Wide zero & span adjustment limits*

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Signal Isolator (Model 9000U - Single/Dual Output)

TECHNICAL SPECIFICATIONS	9000U
Input	Refer Table 1
Input Impedance	For Current I/P 51O
	For Voltage I/P = 5 MO
Response time(Bandwidth)	1ms to 300ms(Default setting=300ms, other on request)
Power Supply	90VAC to 265VAC 45Hz to 65Hz Std.
	18VDC to 36VDC on request.
Power Consumption	Less than 10VA
Output	Refer Table 1
Auxiliary Output	Transmitter Power Supply 24VDC
	Preferred Max load: 1.2KO
	Max current Limit: 26mA Electronic
Isolation	1.5KV AC between
	Input to Output 1
	Input to Output 2
	Output 1 to Output 2
	Input to Power
	Output 1 to Power and
	Output 2 to Power
Accuracy	± 0.1% of FS
Humidity	Upto 95% RH (Non-Condensing)
Ambient Temperature	0 to 55 C
Temperature Coefficient	<100ppm
CMRR	>100dB
NMRR	>70dB
Mounting	DIN RAIL (35 mm) Mounting
Load Resistance	The table below shows corresponding load according to current or voltage ratings.
Load Resistance	**O/Ps**
750O	0mA to 20mA and 4mA to 20mA
910O	-10mA to +10mA
9.1KO	-1mA to +1mA and 0mA to 1mA
200O	0V to 1V,0V to -1V,-1V to 0V,1V to 0V,-1V to 1V and 1V to -1V
1KO	0V to 5V, 0V to -5V, 5V to 0V, -5V to 0V,-5V to +5V and +5V to -5V
1.5KO	10V to 0V,-10V to 0V, 0V to 10V, 0V to -10V, -10V to 10V and 10V to -10V
Size	
Upto Two Outputs	55mm x 75mm x 110mm

TABLE 1

Type of signal	Inputs	Outputs
Unidirectional Increasing Voltage	0 to 10mV	0 to 1V
	0 to 50mV	0 to 1V
	0 to 100mV	0 to 5V
	0 to 1V	0 to 5V
	0 to 5V	0 to 10V
	0 to 10V	0 to 10V
Unidirectional decreasing Voltage	0 to -10mV	0 to -1V
	0 to -50mV	0 to -1V
	0 to -100mV	0 to -5V
	0 to -1V	0 to -5V
	0 to -5V	0 to -10V
	0 to -10V	0 to -10V

TABLE 1 (Cont.)

Positive Unidirectional	+10mV to 0	+1V to 0
decreasing Voltage	+50mV to 0	+1V to 0
	+100mV to 0	+5V to 0
	+1V to 0	+5V to 0
	+5V to 0	+10V to 0
	+10V to 0	+10V to 0
Negative Unidirectional	-10mV to 0	-1V to 0
decreasing Voltage	-50mV to 0	-1V to 0
	-100mV to 0	-5V to 0
	-1V to 0	-5V to 0
	-5V to 0	-10V to 0
	-10V to 0	-10V to 0
Bi directional increasing Voltage	-10mV to +10mV	-1V to +1V
	-50mV to +50mV	-1V to +1V
	-100mV to +100mV	-5V to +5V
	-1V to +1V	-5V to +5V
	-5V to +5V	-10V to +10V
	-10V to +10V	-10V to +10V
Bi directional decreasing Voltage	+10mV to -10mV	+1V to -1V
	+50mV to -50mV	+1V to -1V
	+100mV to -100mV	+5V to -5V
	+1V to -1V	+5V to -5V
	+5V to -5V	+10V to -10V
	+10V to -10V	+10V to -10V
Unidirectional Increasing current	0mA to 1mA	0mA to 20mA
	0mA to 20mA	4mA to 20mA
	4mA to 20mA	4mA to 20mA
Bi directional Increasing Current	-1mA to +1mA	-1mA to +1mA
	-5mA to +5mA	-10mA to +10mA
	-10mA to +10mA	-10mA to +10mA
Bi directional Increasing Current	+1mA to -1mA	+1mA to -1mA
	+5mA to -5mA	+10mA to - 10mA
	+10mA to -10mA	+10mA to - 10mA

ORDERING CODE

9000U - Single/Dual o/p

Input Type		APS		No of O/P & type			
X		XX		X		XX	
C	4-20mA	U1	110-265 VAC	1	One	1	4-20mA
D	0-20mA	U2	18-36 VDC	2	Two	2	0-20mA
E	1-5VDC					3	1-5VDC
F	0-5VDC					4	0-5VDC
G	0-10VDC					5	0-10VDC
S	Special					S	Special

X - Specify from table

S - Specify from table 1, consult factory

Doc.ref.CB-2/9000U - Single/Dual o/p/R2/0110

Signal Isolator (Model 9000U-Three/Four Output)

Masibus signal isolator is a rugged 4 wire isolator designed toaccept custom-built and wide range of voltage and current input signals. Signal is then isolated and converted to standard instrumentation signals, acceptable to commercially off the shelf (COTS) automation products.

Masibus' Signal Isolator enables analog signals to transmit without galvanic connections between the field and the receiving instrument. This in turn allows ground or reference levels to float up to thousands of volts at its input terminals, and prevents circulating current between differing ground potentials that can contaminate input signal. It will isolate the contaminated signal to a clean signal for accurate measurement and control application.

Isolation provided by this signal isolator saves the control system from damage due to accidental application of high voltage or induced voltages on the input signal and in turn avoids wrong output signals to process. They also act as signal distributors when used with more number of outputs. It is available with 3 and 4 nos output for signal distribution. A typical application could be where the signal has to be distributed for indication on local panel, field control room, main control room and DCS system. The Isolator provides a good protection for sensitive system parts against voltage spikes etc.

This model offers a wide range of input/ output signal types include mA, mV, VDC. Built-in transmitter power supply (TPS) can drive field transmitters in case of 4-20mA DC input. It offers excellent accuracy and stability for reliable operation in hostile environments and full isolation safely separates each input channel, each output channel and the power supply.

Features

- *Rugged & accurate 4 wire isolator*
- *Three port isolation*
- *Accepts non-std signal input option*
- *Input:*
  - ? *Voltage ±10mV to ±600VDC*
  - ? *Current ±1mA to ±100mA*
- *Mains/DC operated*
- *3, 4 outputs of different types available*
- *DIN rail/back panel mounted*
- *Built in transmitter powering*
- *Wide zero & span adjustment limits*

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Signal Isolator (Model 9000U-Three/Four Output)

TECHNICAL SPECIFICATIONS	9000U
Input	Refer Table 1
Input Impedance	For Current I/P 51O
	For Voltage I/P = 5 MO
Response time(Bandwidth)	1ms to 300ms(Default setting=300ms, other on request)
Power Supply	90VAC to 265VAC 45Hz to 65Hz Std.
	18VDC to 36VDC on request.
Power Consumption	Less than 10VA
Output	Refer Table 1
Auxiliary Output	Transmitter Power Supply 24VDC
	Preferred Max load: 1.2KO
	Max current Limit: 26mA Electronic
Isolation	1.5KV AC between
	Input to Output 1
	Input to Output 2
	Output 1 to Output 2
	Input to Power
	Output 1 to Power and
	Output 2 to Power
Accuracy	± 0.1% of FS
Humidity	Upto 95% RH (Non-Condensing)
Ambient Temperature	0 to 55 C
Temperature Coefficient	<100ppm
CMRR	>100dB
NMRR	>70dB
Mounting	DIN RAIL (35 mm) Mounting
Load Resistance	The table below shows corresponding load according to current or voltage ratings.
Load Resistance	**O/Ps**
750O	0mA to 20mA and 4mA to 20mA
910O	-10mA to +10mA
9.1KO	-1mA to +1mA and 0mA to 1mA
200O	0V to 1V,0V to -1V,-1V to 0V,1V to 0V,-1V to 1V and 1V to -1V
1KO	0V to 5V, 0V to -5V, 5V to 0V, -5V to 0V,-5V to +5V and +5V to -5V
1.5KO	10V to 0V,-10V to 0V, 0V to 10V, 0V to -10V, -10V to 10V and 10V to -10V
Size	
Three / Four	100mm(W) X 75mm(H) X 110mm(D)

TABLE 1

Type of signal	Inputs	Outputs
Unidirectional Increasing Voltage	0 to 10mV	0 to 1V
	0 to 50mV	0 to 1V
	0 to 100mV	0 to 5V
	0 to 1V	0 to 5V
	0 to 5V	0 to 10V
	0 to 10V	0 to 10V
Unidirectional decreasing Voltage	0 to -10mV	0 to -1V
	0 to -50mV	0 to -1V
	0 to -100mV	0 to -5V
	0 to -1V	0 to -5V
	0 to -5V	0 to -10V
	0 to -10V	0 to -10V

TABLE 1 (Cont.)

Positive Unidirectional	+10mV to 0	+1V to 0
decreasing Voltage	+50mV to 0	+1V to 0
	+100mV to 0	+5V to 0
	+1V to 0	+5V to 0
	+5V to 0	+10V to 0
	+10V to 0	+10V to 0
Negative Unidirectional	-10mV to 0	-1V to 0
decreasing Voltage	-50mV to 0	-1V to 0
	-100mV to 0	-5V to 0
	-1V to 0	-5V to 0
	-5V to 0	-10V to 0
	-10V to 0	-10V to 0
Bi directional increasing Voltage	-10mV to +10mV	-1V to +1V
	-50mV to +50mV	-1V to +1V
	-100mV to +100mV	-5V to +5V
	-1V to +1V	-5V to +5V
	-5V to +5V	-10V to +10V
	-10V to +10V	-10V to +10V
Bi directional decreasing Voltage	+10mV to -10mV	+1V to -1V
	+50mV to -50mV	+1V to -1V
	+100mV to -100mV	+5V to -5V
	+1V to -1V	+5V to -5V
	+5V to -5V	+10V to -10V
	+10V to -10V	+10V to -10V
Unidirectional Increasing current	0mA to 1mA	0mA to 20mA
	0mA to 20mA	4mA to 20mA
	4mA to 20mA	4mA to 20mA
Bi directional Increasing Current	-1mA to +1mA	-1mA to +1mA
	-5mA to +5mA	-10mA to +10mA
	-10mA to +10mA	-10mA to +10mA
Bi directional Increasing Current	+1mA to -1mA	+1mA to -1mA
	+5mA to -5mA	+10mA to - 10mA
	+10mA to -10mA	+10mA to - 10mA

ORDERING CODE

Model 9000U- Three/Four o/p

Input Type		APS		No of O/P & type			
X		XX		X		XXXX	
C	4-20mA	A1	230/110 VAC selectable	3	Three	1	4-20mA
D	0-20mA	A2	24 VDC	4	Four	2	0-20mA
E	1-5VDC					3	1-5VDC
F	0-5VDC					4	0-5VDC
G	0-10VDC					5	0-10VDC
S	Special					S	Special

X - Specify from table

S - Specify from table 1 & consult factory

Doc.ref.CB-2/9000U-Three/Four o/p/R1/0110

Universal Transmitter (Model UT-94)

Masibus Model UT-94 is a 4 wire versatile universal transmitter that isolates & converts wide range of conventional / unconventional process inputs into standard process signals acceptable to commercially off the shelf (COTS) automation products. Signal inverting option is also available. The input circuit can accommodate a variety of input signal levels including bi-directional, reverse, true and live-zero.

A built in digital 4 digit display facilitates the user to monitor process value and helps in fast configuration and calibration.

Model UT-94 enables analog signals to transmit without galvanic connections between the field to the receiving instrument. This in turn allows ground or reference levels to float up to thousands of volts at its input terminals, and prevents circulating current between differing ground potentials that can contaminate input signal.

Isolation provided by Model UT-94 saves the control system from damage due to accidental application of high voltage or induced voltages on the input signal and in turn avoids wrong output signals to process. Isolation provides a good protection for sensitive system parts against voltage spikes etc.

Model UT-94 offers a wide range of input/ output signal types include mA, mV, V, RTD, TC. Built-in transmitter power supply (TPS) can drive field transmitters in case of 4-20mA DC input. Model UT-94 offers excellent accuracy and stability for reliable operation in hostile environments and full isolation safely separates each input channel, each output channel and the power supply.

Model UT-94 is equipped with advanced functions like digital filtering, password setting, input and output protection and square root function for optimum process functionality.

Features

- *Smart universal transmitter with local display*
- *Wide choice of input types*
- *Three port isolation*
- *Software selectable mA and V output*
- *Fully configurable through front keys*
- *Accepts live-zero, true-zero, bi-directional or reverse/inverted input signals*
- *DIN rail mounted*
- *Built in transmitter powering*
- *Output range limit facility*
- *Digital filter & sq.root extractor*

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Universal Transmitter (Model UT-94)

TECHNICAL SPECIFICATIONS	UT-94
Input	Refer Table 1
Display	4 digit, 0.3", seven segment red LED
Display Scaling	-1999 to 9999
Display Range	
RTD (Pt 100)	-199.9 TO 850.0 °C
Linear	-1999 to 9999 (selectable)
Thermocouple	As per sensor range
Keys	3 Keys (ENT, SEL & ESC)
No. of Input	One
Input Accuracy	0.1% of Full Scale
Response Time	75 mS
Linearization Method	Through Software, using 9th order Co-efficients.
No. of Outputs	Upto Two (O/P-2 is Optional)
Output Types	4 -20mA, 0 -20mA , 1-5V, 0-5V, 0-10VDC (Either Voltage or Current from a channel at a time, field selectable)
Output Load	750 Ohms max (For Current O/Ps) 4000 Ohms min (For Voltage O/Ps)
Output Accuracy	0.25% of Full Scale
Transmitter Power Supply	24 VDC@30mA with short circuit protection
Calibration	Through front panel keys
Cold Junction Compensation	By software
Over Range Output	5% above FS (Not applicable for Voltage Inputs)
Protection	Short circuit & Open circuit
CMRR	> 120 dB
NMRR	> 50 dB
Thermocouple Burn Out	Programmable
Operating Supply	85-265 VAC or 18-30 VDC (optional)
Power Consumption	< 10 W
Isolation	Three port isolation I.e. between input/ output/ power supply
Isolation Level	1500 VDC between input, outputs and power supply
Mounting	DIN Rail
Dimension	55 (W) x 75 (H) x 110 (D) mm
Weight	Less than
Operating Temperature	0 to 55 °C
Operating RH	0 to 95 % RH Non condensing
Advance Options	
Digital filter	0-300 Second
Password setting	Available
Square root	Available for linear inputs only
Output direction	Direct / Reverse (programmable)
Output signal limit	Available (low and high)
Engineering unit	°C, °F, °K (for T/C and RTD inputs)
Decimal point	Programmable for linear inputs

TABLE 1

Input	Range	Resolution
E TC	-200 to 1000 °C	# 0.1 °C
J TC	-200 to 1200 °C	# 0.1 °C
K TC	-200 to 1370 °C	# 0.1 °C
T TC	-200 to 400 °C	0.1 °C
B TC	450 to 1820 °C	1 °C
R TC	0 to 1750 °C	1 °C
S TC	0 to 1750 °C	1 °C
N TC	-200 to 1300 °C	# 0.1 °C
RTD Pt100	-200 TO 850 °C	0.1 °C
-10 to 20 mV	-1999 to 9999 Counts	1 Count
0 to 100 mV	-1999 to 9999 Counts	1 Count
0 to 2 V	-1999 to 9999 Counts	1 Count
0.4 to 2 V	-1999 to 9999 Counts	1 Count
* 0 to 20 mA	-1999 to 9999 Counts	1 Count
* 4 to 20 mA	-1999 to 9999 Counts	1 Count
0 to 5 V	-1999 to 9999 Counts	1 Count
1 to 5 V	-1999 to 9999 Counts	1 Count
0 to 10 V	-1999 to 9999 Counts	1 Count

Resolution 1 °C after 999.9 °C

* Connect 100 ohms 0.1% resistance at input.

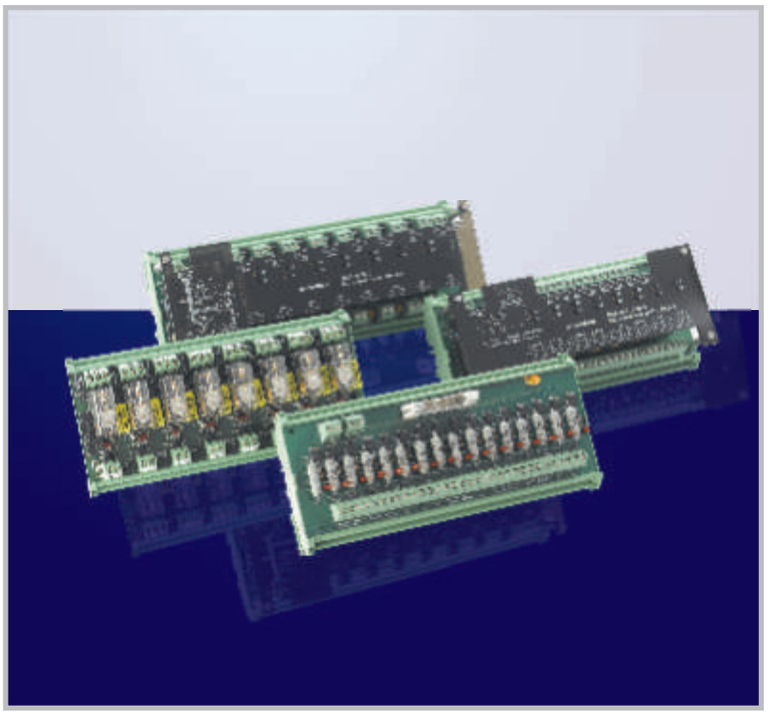
ORDERING CODE

Model UT-94							
Input Type		APS		No of AO & type			
X		XX		X		X	
1	E	U1	85-265VAC	1	One	1	4-20mA
2	J	U2	18-30VDC	2	Two	2	0-20mA
3	K					3	1-5VDC
4	T					4	0-5VDC
5	B					5	0-10VDC
6	R						
7	S						
8	N						
9	Pt-100, 3W						
C	4-20mA						
D	0-20mA						
E	1-5VDC						
F	0-5VDC						
G	0-10VDC						
W	0.4 to 2 V						
X	-10-20 mV						
Y	0-100 mV						
Z	0-2 V						

X - Specify from table

Doc.ref. CB-2/UT94/ R2/0110

Signal Interface Module



Masibus Signal Interface Modules are designed to interface variety of analog and digital signals to PLC/DCS/RTU products. These modules are compact universal DIN rail mounted with labeled input and output connections, these modules are used in applications like industrial process control, factory automation, SCADA and DAS.

Signal Interface Modules offered are 8 channel RTD module, 8 channel isolated analog input module, 16 channel digital input module and 8 channel relay output module. We have custom built various analog and digital field interface modules with/without galvanic isolation and different levels of input and output protections for rugged, stable and reliable operations.

These modules are rated to be used even in harsh environment up to 55 deg C ambient temperature and 95% relative humidity (Non-Condensing). All these modules are DIN rail mounted and uses phoenix profile case & MKDS phoenix screw type terminals which can accept up to 2.5 mm2 wires to connect. Power ON LED indication is provided in each of Signal Interface Modules. We can provide interfaces to DCS/PLC either with terminals or connectors.

Relay interface module has 8 channel relay with contact rating upto 10A @ 250VAC. Relay ON & OFF time is less than 15 mS.

RTD interface module has 8 RTD Pt100, 3W input channels and offers field selectable 4-20 mA/ 1-5 V. Calibration for each channel is done by Zero & Span setting by trim-pots. Response time is less than 50 mS. This interface module is equipped with reverse voltage, open sensor & surge protection.

Analog interface module has 8 channels that accepts various types of current/ voltage signals and converts them to isolated current/ voltage signals.

DI interface module has 16 channels that offers open collector output.

Features

- *Multichannel configuration field interface modules*
- *Variety of analog & digital I/O modules*
- *Isolates field signal from DCS/PLC*
- *In built protections, where required*
- *Universal DIN rail mounted*
- *Compact size*
- *User friendly labeling*
- *Terminal/connector based configuration*
- *High stability*
- *OEM product*
- *Independent zero & span adjustment for each channel*

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Signal Interface Module

Analog RTD Input Module Specifications	MAS-AI-RTD-08-D
Input Signal	RTD Pt 100, 3 wire
Range	As per table 1
Output Signal	DC Signal 4-20mA / 1-5V field selectable
Calibration	Zero & Span of output can be adjusted by Trim pots
Loading	
For Current	Up to 750 Ohms
For Voltage	More than 250K
Output Accuracy	±0.1% of output span
Response Time	< 50 mS
Temp. Effect	Less than ±0.009% of output span per °C over ambient
Isolation	1.0KV AC for one minute
	Between Power and Internal circuits
Burden	0.5W per channel
Power ON indication	RED LED
Protection	Reverse voltage, open sensor and surge protected
Weight	Less than 375 gms
Dimensions	178(L) x 72(B) (all in mm)

Table 1

RTD Pt 100 type standard ranges

-100 to 100°C	0 to 100°C
-100 to 200°C	0 to 200°C
-100 to 300°C	0 to 300°C
-100 to 400°C	0 to 400°C
-100 to 500°C	0 to 500°C
-100 to 600°C	0 to 600°C

ORDERING CODE - RTD MODULE

Model	Input Range	
MAS-AI-RTD-08-D8	X	
	1	0 to 100°C
	2	0 to 200°C
	3	0 to 300°C
	4	0 to 400°C
	5	0 to 500°C
	6	0 to 600°C

X - Specify from table

Analog Linear Input Module Specifications	MAS-AI-08-D
Input Signal	DC Volt/Current - Factory set
Output Signal	DC Volt/Current - Factory set
Signal Range	As per table 2
Calibration	Zero & Span of output can be adjusted by Trim pots
Loading For Current	450 Ohms
For Voltage	Greater than 2K
Output Accuracy	±0.1% of output span
Response Time	< 50 ms
Temp. Effect	Less than ±0.009% of output span per °C over ambient
Isolation	1.0KV AC for one minute Input to Output & Power, Output to Input & Power, Between Individual Input channel.
Burden	1.7VA + 0.8VA per channel
Power ON indication	RED LED
Function	Reverse voltage and surge protection
	Bipolar voltage / current input
	Three port isolation
Weight	Less than 500 gms
Dimensions	220(L) x 72(B) (all in mm)

Table 2

Linear Input Type standard ranges

Input type	Min. Range	Max. Range	Code
+Ve Volt	0 to 10mV	0 to 10V	1
-Ve Volt	0 to -10mV	0 to -10V	2
+Ve Curr.	0 to 1mA	0 to 20mA	3
+Ve Re. V	10 to 0mV	10 to 0V	4
-Ve Re. V	-10 to 0mV	-10 to 0V	5
Bi-Dir V	-10 to +10mV	-10 to +10V	6
	+10 to -10mV	+10 to -10V	7
Bi-Dir Curr	-1 to +1mA	-10 to +10mA	8
	+1 to -1mA	+10 to -10mA	9

Linear Output type standard ranges

Output type	Min. Range	Max. Range	Code
+Ve Volt	0 to 10mV	0 to 10V	1
+Ve Curr.	0 to 1mA	0 to 20mA	2
+Ve Re. V	10 to 0mV	10 to 0V	3
Bi-Dir V	-10 to 10mV	-10 to +10V	4
	+10 to -10mV	+10 to -10V	5
Bi-Dir Curr	-1 to +1mA	-10 to 10mA	6
	+1 to -1mA	+10 to -10mA	7

ORDERING CODE - ANALOG MODULE

MAS-AI-08-D - I X - O X

X - Specify code from table 2
I - Input type & range from table 2
O - Output type & range from table 2

Signal Interface Module

Digital Input Module (AC Excitation Voltage) Specifications	MAS - DI
Input	16 optically isolate digital input channels
	90-140Vrms input voltage
	6.5mA(rms) input current at 110V(rms)
	5mA(rms) drop out current, 50V(rms) allowable off-state voltage (at 0.1mA output)
Output Signal	Open Collector
	24VDC Nominal Voltage
	5mA Nominal Current
	50VDC Maximum Voltage
Isolation	500V AC for one minute
	Input to Output Circuits.
External Supply	24VDC ±10%
Functions	Termination on phoenix terminal
	FRC connector for PLC/DCS wiring
	Optical isolation between input and output of 2.5KV
	Compact size for space saving
	LED indication for all channels
Weight	Less than 250 gms
Dimensions	194(L) x 72(B) (all in mm)

ORDERING CODE - DI MODULE

MAS - DI - 110 - 16 16 channel Digital Interface Module

Relay Output Module Specifications	MAS-DO-RL-08-D
No. of relays	Eight
Relay Contact	
Relay Type	SPST-NO, Normally open, Plug-in type
Contact rating Resistive	10A at 250VAC (Max Power 2500VA)
	10A at 30VDC (Max Power 300W)
Inductive Load	7.5A at 250VAC (Max Power 1875VA)
	5A at 30VDC (Max Power 150W)
Maximum Switching Voltage	380VAC / 125VDC
Relay ON time	15mS
Relay OFF time	20mS
Dielectric Strength	1500VAC, For one minute between coil and contact
Insulation Resistance	1000MΩ (at 500VDC) Between coil and contact
Life Expectancy	For max. rating 10^4
Relay Coil	
Nominal	24VDC
Min	17VDC
Release	4VDC
Max.	27VDC
Resistance	1.1KOhms
Fuse	5A fast blow, 250VAC Individual contact
Indication	Coil ON
Selection	Source / Sink by jumper (Input side) Common C by jumper Snubber Action contact C with NO/NC by jumper
Functions	Omron G2R-1 relay with socket for high MTBF
	Free-wheeling diode protection
Burden	0.53W / Relay
Weight	Less than 500 gms
Dimensions	185(L) x 72(B) (all in mm)

ORDERING CODE - RELAY MODULE

MAS-DO-RL-08-D 8 channel Relay Output Module

COMMON SPECIFICATIONS	
Temperature	0 to 55°C
Humidity	5-95% RH non condensing
Power	24VDC ±10% For Analog Input Modules
Terminations	Phoenix screw type can accept up to 2.5 square mm wire
Mounting	DIN rail mounting
Case Material	Phoenix profile
Circuit Boards	Copper cladded and laminated
	FR-4 grade epoxy glass

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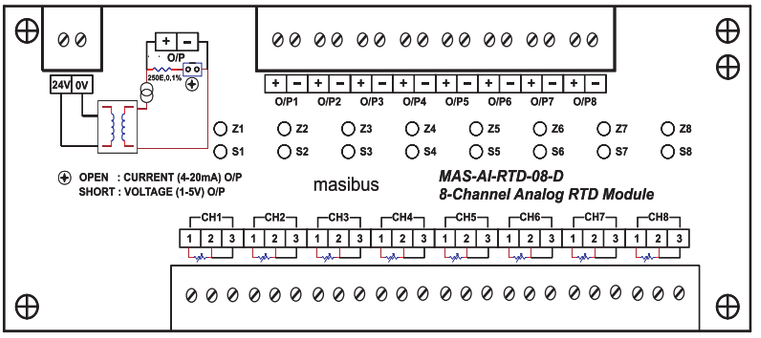
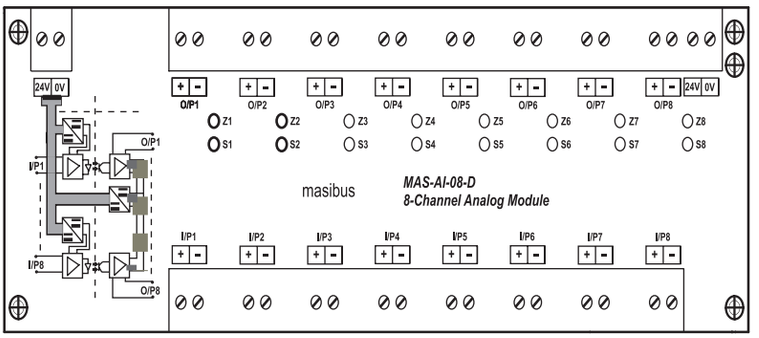
Signal Interface Module

CONNECTION DETAILS

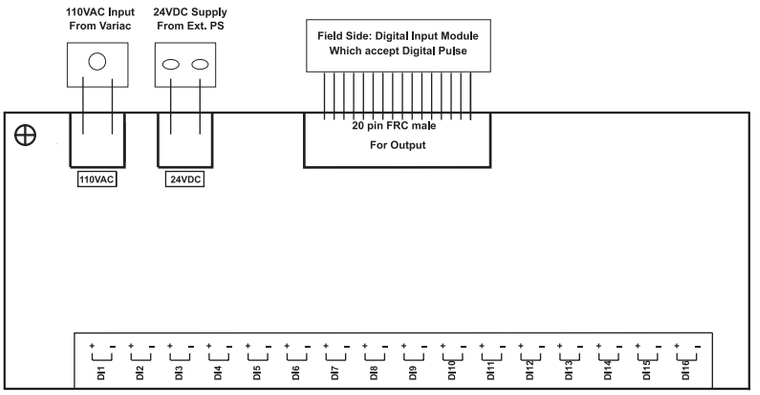
RTD Module



Linear Analog Module

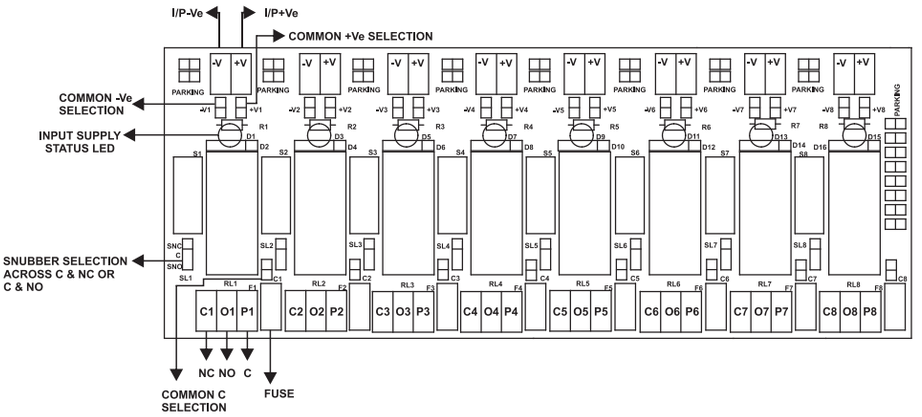


Digital input Module

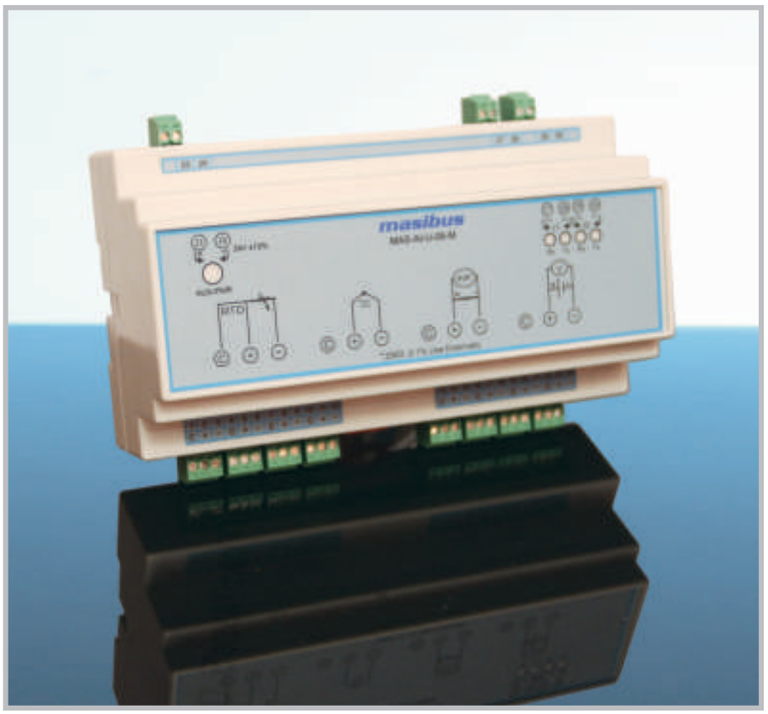


Field Side: MKDS Input Terminals

Relay Module



Modbus I/O (Model MAS - AI - U - 8 - M)



Masibus has introduced a new range of low-cost Modbus based remote IO unit, which provide an easy way for integrating analog signals to supervisory SCADA systems. There are several inputs which this model accepts as an input like mA, V, Pt100, different types of thermocouple, etc. Modbus IO module measures all field signals with accuracy of 0.1% of FS.

MODBUS-IO module is equipped with high speed scanning and all 8 channels are scanned within 1 second irrespective of type of inputs configured. This module is powered by 24VDC auxiliary power supply and power consumption is limited to 3 watts maximum.

This module provides isolation between channel to channel plus all input signals is isolated from power thus protecting the electrical instruments by eliminating ground loop effects. This reduces substantially the undesirable interferences and instabilities in sensor measurements.

MODBUS IO can be easily configured and calibrated via the digital interface by using the Windows based MASIBUS mAIM software. MODBUS IO configuration is done via the RS485 interface by using Modbus RTU commands. The software supplied FREE allows for configuration of MODBUS features as well as complete calibration and diagnosis. It automatically detects active devices in the Modbus network and permits configuration of all parameters.

MODBUS IO module is compact in design and sits on DIN rail mounting of the panel.

Features

- *Accepts mA, V, RTD, T/C - Programmable*
- *8 channels 16 bit resolution*
- *Full Isolation: Supply/input/output and between channels*
- *Dual serial Modbus communication port*
- *24VDC aux power supply*
- *Programming & calibration through PC software*
- *DIN rail mount*
- *Cost effective as Distributed IO*

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Modbus I/O (Model MAS - AI - U - 8 - M)

Input

Input	Type	Range	Accuracy
TC	E	-200 to 1000ºC	±0.1% Of Full span ± 1 digit
	J	-200 to 1200ºC	
	K	-200 to 1350ºC	
	T	-200 to 400ºC	
	B	450 to 1800 ºC	
	R	0 to 1750 ºC	
	S	0 to 1750 ºC	
RTD	Pt 100	-200 to 850ºC	
* DC Current	4-20mA	-1999 to 19999	
	0-20mA		
DC Voltage	0-5 V		
	1-5 V		
	0-10 V		

No of channels : 8

Resolution : 16 bit

Isolation : Channel to channel isolation 350 V P-P

Supply and Communications Ports: 1500V RMS

Scan Time : All Channels in 1 sec

Drift : 100ppm / ºC.

Accuracy : 0.1 % FS

Communication

Communication Interface	Based on EIA RS-485.
Communication method	Half-duplex communication, start stop synchronous.
Communication Speed	4800/9600/19200/ 38400bps.
Parity	None.
Stop bit	1
Communication Protocol	Modbus RTU.
Connectable number of unit	Max. 31 unit per host computer. Address setting by software.
Communication error detection	Double detection by parity and checksum.

Mode

Configuration : I/p type, zero span, decimal point, slave address, band rate, skip/ unskip.

Calibration : Zero span, ambient, default setting.

Run mode : I/p type, zero span, PV, skip/ unskip.

Supply voltage : 24volt (±10% DC)

Power Consumption : Max. 3 watt

CMRR : > 100dB

NMRR : > 60 dB

Environment : Ambient: 0 to 55 ºC.
Humidity: 20% to 95% RH
(Non-condensing).

Case

Material : ABS plastic

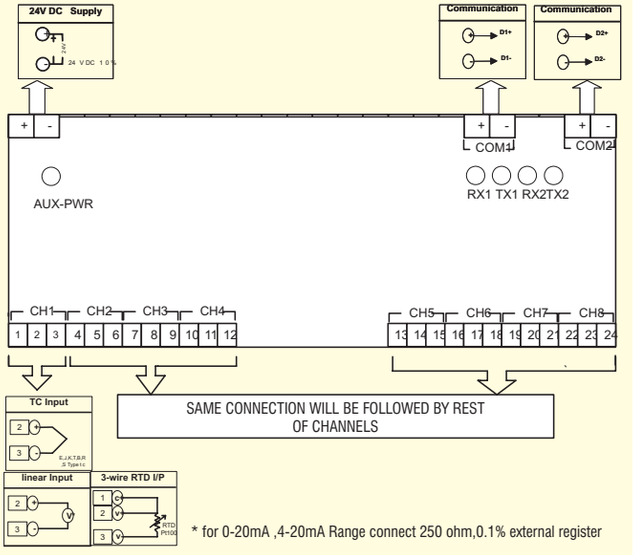
Color

Mounting method : Din-Rail mounting.

Dimension : 90(W) * 60(H) * 160(D) in mm

Weight : 380 g

2.2 TERMINAL CONNECTIONS :



* for 0-20mA ,4-20mA Range connect 250 ohm,0.1% external register

Fig.3

Doc.ref.CB-2/MAS-AI-U-8-M/R0/0110

Process Scanner (Model 85XX)

Masibus' continues to be the leader in the process scanner market with its innovative product features. Model 85XX is Masibus' flagship product designed for versatile industrial monitoring and machine protection applications.

Model 85XX is the latest and most advanced multi-channel monitoring and alarm annunciation system. This is one of the popular models among our OEMs & end users. Our scanner product range is now serving market needs for more than 20 years & still going strong due its excellent performance, stability & reliability.

Model 85XX features configurable and universal input types per channel and displays sequentially in engineering unit. Model 85XX is modular in design and all I/O cards are plug-in type. Model 85XX comes in three variations 8/16/24 channels. 8/16 Channel scanner is capable of field upgrade for higher channels. In addition to most of popular process inputs, Model 85XX can also accept special RTDs like Cu-53 & Pt-46 3W. Option for channel to channel online isolation up to 125V AC and 300V DC and off-line isolation up to 500VDC is available for critical applications.

The terminal back-plate is pluggable type which can be detached from the instrument without removing field connections, saving lot of maintenance time. This unit is fully programmable, configurable from front keys and also by software. Calibration is done digitally using front keys, without trim-pots.

Model 85XX comes with password protection for all configurable data. User can program individual alarm and trip set points and logic individually or in group. Channels can be configured up to 6 groups with two relay outputs per group. Two discrete LEDs are provided per channel for visual annunciation. Model 85XX also has optional retransmission output (up to 4) which are user configurable channel or group mapping. Model 85XX also provides serial communication as an option.

Features

- *Micro-controller based advanced process scanner*
- *8/16/24 channel configuration*
- *Universal input for each channel-mix*
- *Most flexible, user defined alarm/trip logic*
- *Individual or group alarms*
- *One-shot algorithm*
- *Options :*
  - ? *Upto 4 Retransmission output (Isolated)*
  - ? *RS 485 Serial communication*
  - ? *Direct serial printer interface*
  - ? *48 open collector outputs*
  - ? *Channel to channel input isolation*
  - ? *Weather proof / flame proof enclosure*

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Process Scanner (Model 85XX)

TECHNICAL SPECIFICATIONS	85XX
DISPLAY	
Channel number	2 digit 0.56" Red seven segment LED's
PV display	4 digit 0.56" Red seven segment LED's
Mode selection	Discrete Red LED's
	Individual discrete Red LED's to indicate channel status.
INPUT	Universal Input
No. of inputs	8,16 or 24
Thermocouple type	E, J, K, T, B, R, S (ANSI Standard)
RTD	Pt 100, Pt 46, CU-53 3-wire
Linear	4-20 mA / 1-5 V DC / 0-20 mA / 0-5 V DC (250 ohm/0.1% external Resistor required)
Digital input	Wetted internally
	Digital input is mapped on 0-5V input and display is as "ON " if input voltage is less than 2.5v DC and "OFF" if input voltage is greater than 2.5v DC. The reverse feature can be obtained on using UPSCALE/DOWN SCALE of open sensor. There is no relay or any output action for digital input
CJC compensation	Automatic for thermocouple types
Three wire cancellation	Automatic by software for RTD types
Accuracy	± 0.1% of FS ± 1 count
Sampling Speed	T/C & Linear Input -250 mS per channel
	RTD Input - 450 mS per channel
Display Scan Rate	Setting from 1 to 99 seconds
CMRR	> 120 db @ 50Hz
NMRR	> 40 db @ 50Hz

TECHNICAL SPECIFICATIONS	85XX	
Range		
E	-200 to 1000	°C
J	-200 to 1200	°C
K	-200 to 1372	°C
T	-200 to 400	°C
B	400 to 1820	°C
R	0 to 1768	°C
S	0 to 1768	°C
Cu-53	-210 to 210	°C
PT46	-200 to 600	°C
PT100(RTD 1)	-199 to 850	°C
PT100 (RTD 0)	-199.0 to 200.0	°C
4-20mA - Field scalable	-1999 to 9999	Counts
0-5 V - Field scalable	-1999 to 9999	Counts
Calibration	Ambient, Zero and span adjustable by digital calibration through front panel keys. No trim- pots	
	Zero Span Calibration of output through front panel keys	
	One shot Calibration of both input and output	
	Self check calibration through front panel keys	
Controls	Verify, Increase, Decrease, Auto/Man, Next/Group Check, Skip/Self Check, Al1/Al2, Scan Time/Print Time and Enter/ ACK keys for operation, programming & calibration	
Serial Communication	Isolated RS232/485 Serial Communication	
Protocol	MODBUS RTU or Standard Serial Printer Output	

Data Logging(Optional)

Periodic logging:

Memory Capacity: **5MB Flash**

Real Time Clock

Data Log: Measured Value with Time stamping.

Log Period: 1 minutes to 99 minutes

Channel Selection: Any Channel can be configured for data logging or Data Logging on demand, separate key available as "DATA LOGGING" facilitates the user to log the required channel data on its invoking.

Max. Total records : 60964

Event logging:

Memory Capacity: 1MB Flash

Real Time Clock

Data Save: Measured Value with Time stamping.

Channel Selection: Any Channel can be configured for data logging. OR Data Logging on demand, separate key available as "DATA LOGGING" facilitates the user to log the Required channel data on its invoking.

Max. total records : 23800

Note: Once datalogging facility is opted in Scanner, PC based mscan software is supplied as standard for scanner configuration, calibration and fetching logged data from scanner memory.

OPTIONS FOR AUXILIARY OUTPUTS

	Relay card	Analog Output Card	Open Collector Card	Printer Card
	2relay/1relay(per group)			
Slot 1	3 groups(1 to 3) with 2 set points/	Two Isolated Retransmission groups	24 Open Collector Outputs	
	6 groups(1 to 6) with 1 set point	(Gr. No.: 1 and 2)		
Slot 2	3 groups(4 to 6) with 2 set points	Two Isolated Retransmission groups	24 Open Collector Outputs	Centronics Printer Port interface
	6 groups(7 to 12) with 1 set point	(Gr. No.: 3 and 4)		
Common Description	2A@230V A.C. with N.O./C/N.C.	Groups:- MAX or MIN		
	Relay Mapping possible with number of channels	Outputs:- 4-20mA		
		Accuracy:- 0.25% of Range	24V D.C. @ 100mA externally wet Contacts	Parallel printer port
		Load:- 250 Ohms		

NOTE: The possible combinations are explained in the operational manual in Topic no. 8.

Process Scanner (Model 85XX)

TECHNICAL SPECIFICATIONS	85XX
General	
Power supply	85V to 265V AC 50 Hz
	24 V DC, 125 to 280 VDC, 110 VDC optional
Ambient temperature	0 to 55 °C
Humidity	Up to 95% RH (Non-condensing)
Power consumption	Less than 20 VA
Scanning time	For T/C and Linear input - 250 mS
	For RTD - 450 mS
Physical	
Case	M.S. powder coated with ABS molded bezel
Terminals	Screw type, can accept up to 2.5 mm^2 wire
Bezel size	96(W) X 192(H) (all in mm)
Depth behind panel	Less than 250mm (with terminal plate)
Panel cutout	92(W) X 188(H) (all in mm)
Special Features	Real time RTC interface for Serial or parallel printer output (option)
	Print on Time and Hot printing feature
	Print time setting from 0-99 minutes
	Scanner is fully addressable and configurable through software on MODBUS protocol
Other Options	Channel to channel online isolation up to 125V AC and 300V DC and off-line isolation up to 500VDC is available for critical applications
	PCLOG software available for real time display, alarm, trend and reporting purpose
Relay Logic	
Alarm AL1	Momentary alarm (when in abnormal condition ACK is pressed)
	Condition - high/ low/ vlow
	Lamp - on/ off/ flash/ latch
	Relay - on/ off/ latch
Alarm AL2	Momentary alarm (when in abnormal condition ACK not pressed)
	Condition - vhigh/ high/ low
	Lamp - on/ off/ flash/ latch
	Relay - on/ off/ latch

TECHNICAL SPECIFICATIONS	85XX
Alarm AL1	Maintained alarm (when in abnormal condition ACK is pressed)
	Condition - high/ low/ vlow
	Lamp - on/ off/ flash/ latch
	Relay - on/ off/ latch
Alarm AL2	Maintained alarm (when in abnormal condition ACK not pressed)
	Condition - vhigh/ high/ low
	Lamp - on/ off/ flash/ latch
	Relay - on/ off/ latch

NOTE: The possible combinations are explained in the operational manual in Topic no. 12.

Protection	
Input range protection	This restricts accidental wrong setting of set-point
	Instrument displays 'OVER' and 'UNDR'
Input open protection	Upscale/downscale (programmable)
Operation modes	
Run mode	Channel window will display current channel number and data window will display process value.
Auto/manual mode	Auto mode displays all un-skipped channels sequentially where as manual mode displays one channel selected manually continuously.
Program mode	This mode is used to display/ change alarm limits, scan time and skip status of channels.
Configuration mode	This mode is used to change basic configuration of unit like scanner type, input type, number of groups, set-point type, abnormal status, relay status, alarm latching, numbers of channels in group, open sensor, hysteresis, zero and span value, decimal point position, password, serial number, serial output type, baud rate and open collector type.
Verify mode	This mode is to verify the alarm units, scan time and channel skip information during run time.
Calibration mode	This mode is used to calibrate ambient, zero and span.

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Process Scanner (Model 85XX)

Process Variable MODBUS Addresses

Sr.no	Analog Parameters	Absolute Address	Type of Access	Parameter Type
1.	CH1	40001	Read only	Int
2.	CH2	40002	Read only	Int
3.	CH3	40003	Read only	Int
4.	CH4	40004	Read only	Int
5.	CH5	40005	Read only	Int
6.	CH6	40006	Read only	Int
7.	CH7	40007	Read only	Int
8.	CH8	40008	Read only	Int
9.	CH9	40009	Read only	Int
10.	CH10	40010	Read only	Int
11.	CH11	40011	Read only	Int
12.	CH12	40012	Read only	Int
13.	CH13	40013	Read only	Int
14.	CH14	40014	Read only	Int
15.	CH15	40015	Read only	Int
16.	CH16	40016	Read only	Int
17.	CH17	40017	Read only	Int
18.	CH18	40018	Read only	Int
19.	CH19	40019	Read only	Int
20.	CH20	40020	Read only	Int
21.	CH21	40021	Read only	Int
22.	CH22	40022	Read only	Int
23.	CH23	40023	Read only	Int
24.	CH24	40024	Read only	Int

ORDERING CODE

Model	No of Input	Input type/Configuration	X Datalogging	PS	Communication	Display Col.	Mounting	Auxiliary o/p
85XX	X	XX X	N None	XX	X	X	XX	XX
			Y Yes #					Relay / OC / AO

8	Eight	NF	Non Iso. Fix	1	E	U1	85-265VAC	N	None	R	Red	P0	Panel	XX	0 / 0 / 0
A	Sixteen	NM	Non Iso. Mix	2	J	U2	125-280VDC	1	RS232	G	Green	W1	Wall-IP55	XR	1 / 0 / 0
B	Twenty four	IF	Isolated Fix	3	K	A3	24VDC	2	RS485			FP	Wall-FLP	XO	0 / 1 / 0
		IM	Isolated Mix	4	T	A4	110VDC	3	Printer Serial					XA	0 / 0 / 1
				5	B			4	Printer Parallel					RR	2 / 0 / 0
				6	R									OO	0 / 2 / 0
				7	S									AA	0 / 0 / 2
				9	Pt-100, 3W									RA	1 / 0 / 1
				A	Cu-53										
				B	Pt-46										
				C	4-20mA										
				D	0-20mA										
				E	1-5VDC										
				F	0-5VDC										
				S	Special*										

0, 1, 2 - Number of cards

Note:
1. With Mix input option-No AO card
2. If printer parallel option is selected RR, OO, AA, RA option is not available.

X - Specify from table

- Printer port (serial / parallel) is not available in communication.

* - Consult factory

Doc.ref.CB-2/85XX/R2/0110

Datalogger (Model 8040)

Masibus Datalogger, Model 8040 is uniquely suitable for compactly configuring a data acquisition environment using a PC as a human interface. Model 8040 is available in two versions, a half 19" rack module that can acquire data from upto 48 channels, and an expandable full 19" rack module with a maximum of 112 channels. Both versions internally log and also transfer measured variable in real time to PC.

They are remotely controlled by the host computer through a set of commands and transmitted in a RS-485/RS232 network. The modular design also provides more flexibility in the system configuration.

The Datalogger system architecture includes a power supply card, CPU card with a built-in RS-232/RS-485 communication port, input and output cards.

Datalogger enables user to log the real time data with time stamping. One can select input channel number for log and print purpose with specified time interval from operator terminal keys or using Masibus mACplus software. Print on demand facility is also available. mACplus software works on windows platform and is used for datalogger configuration, calibration and retrieving logged data to PC.

Alternatively, operator terminal is used for local display, configuration and programming of datalogger. Operator terminal is equipped with 24 keys and uses 2x16 alphanumeric LCD screen as user display interface.

Model 8040 is much smaller and lighter than our previous model occupying significantly less space. It can provide high speed measurement having a scanning speed of 1 second for 112 channels. Provision for 8 channel DO module provides alarm signal to annunciate abnormal process condition. 4 alarm levels per channel can also be configured.

Features

- *16 - 112 channel datalogger*
- *Scans 112 channel in 1 second*
- *Three concurrent serial com. ports*
- *One Centronics printer port*
- *2 x 16 character LCD Operator display terminal*
- *Universal input for each channel-mix*
- *Channel to channel input isolation option*
- *512K battery backed memory*
- *Host computer/ operator terminal programmable*

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Datalogger (Model 8040)

TECHNICAL SPECIFICATION

Mechanical Dimensions (when I/O modules are installed)

Half 19" rack system	Approximately 270(W) x 132.5(H) x 260(D)
Full 19" rack system	Approximately 482 (W) x 132.5(H) x 260(D)

AC Power Supply

Rated Supply Voltage	90 to 260 VAC / 120 to 370V DC
Rated Supply Frequency	50/60 Hz 3%
Power Consumption	Less than 35 VA
Power Connection	3 pin terminal strip
Insulation Resistance	> 50 M Ω (between AC supply & earth)
Dielectric Strength	1.5KV AC for 60 seconds between AC supply & Earth.

Normal Operating Condition

Ambient Temperature:	0 to 55 °C
Relative Humidity	5 to 90% RH (Non condensing)

PLUGGABLE MODULES

Standard Configuration & Module Specification

The Following Modules can be installed in a main rack to configure Data Acquisition System.

SMPS Module	85 to 264 VAC or 120 to 370V DC
	50/60 Hz 3 % Supply Module

Analog Input Module

Non-Isolated Analog Input Module	Universal Input (E, J, K, T, B, R, S, RTD Pt 100 & Linear inputs)
	Configuration of each channel based on sensor types used
	Each Input Module consists of 16 channels
	Measurement Range: Refer component specification for more details
Isolated Analog Input Module (optional)	300 V DC isolation between channel to channel
	Universal Input (E, J, K, T, B, R, S, RTD Pt 100 & Linear input)
	Configuration of each channel based on sensor types used
	Each Input Module consists of 16 channels
	Measurement Range: Refer component specification for more details

CPU MODULE

Isolated Communication Port for Host Computer	RS232 / RS485 isolated communication
	RS232 isolated communication another port also available
Protocol	Modbus RTU
Baud-rate	2400,4800,9600,19200 (programmable)
Distance	Up to 20m for RS232 and 1.2Km for RS485
Connector	9 pin female D type
Isolated Communication Port for Operating Terminal	RS422 communication
Protocol	Modbus RTU
Baud-rate	19200 bps
Distance	Up to 20m
Connector	RJ45 connector
Centronics Printer interfacing Port	Parallel port interfacing
Protocol	Parallel Printer protocol

CPU MODULE

Print period	Settable in Hours and Minutes
	OR Print on demand, separate key available as "PRN" facilitates the user to print the required channel on its invoking, irrespective of print period
Print channel selection	Any channel can be dumped to the printer
Print on Alarm	User Selectable
Connector	25 pin D type
	Vertical printing format (fixed)

Memory

Memory Capacity	512KB Non-Volatile RAM with battery back-up
Real Time Clock	Provided
Data Save	For measured value with time stamping
Logging Period	In Hours: Minutes: Seconds
Data log Format	With decimal
Channel Selection	Any Channel can be configured for data logging. OR Data Logging on demand, separate key available as "DATA LOGGING" facilitates the user to log the required channel data on its invoking.
Logging Start Stop	Enabled through Key pad
Log Data Printing	Available for logged records
Downloading facility	Through MAC-plus software using Modbus protocol on excel format

Alarm Module

Relay output module or Open collector module or Alarm Indication Module can be used as Alarm Module

Set point type can be configured for either 2 or 4 set points

2 Set-point configuration	High Very High (H-VH)
	Very Low - Low (VL-L)
	Low - High (L-H)
4 Set-point configuration	Very Low - Low - High - Very High (VL-L-H-VH)

OPEN COLLECTOR OUTPUT MODULE

16 common open collector output is provided with this module.
(With the same functions as provided with relay output module)

Open Collector Logic Type	Sinking Logic
Potential Wetting	External
Wetting Voltage Rating	24V DC @ 100mA

Connector: o/c interface: 25 pin type female connector.

Application: Any o/p can be mapped to any channel for alarm

Datalogger (Model 8040)

TYPES & NUMBER OF MODULES THAT CAN BE PLUGGED

Total 5 modules can be installed in half 19" rack system & 9 module can be installed in full 19" rack system. Out of total modules, power supply module & CPU module is required with each system. Other modules can be as per requirement.

Maximum 2 modules of Relay module or open collector module possible per system.

One Module of Alarm Indication possible per system.

INPUT MODULE SPECIFICATION

Thermocouple Inputs

Types	E, J, K, T, B, R , S
Cold-junction error	±2 °C maximum, 0 to 55 °C
Resolution	1°C
Accuracy	±(0.1% of Full Scale +1digit)
Temperature range	See table 1
Input Impedance	> 2 M O
Cold junction compensation	0 to 55 °C
Open thermocouple indication	"Open" displayed

RTD Inputs

Types	Pt-100, 3 wire
Resolution	0.1°C
Accuracy	±(0.1% of Full Scale +1digit)
Temperature range	-200 to 850
3 Wire compensation	Using Hardware Technique
Open RTD indication	"Open" displayed

Voltage & Current Input

Type	0 to 5V, 1 to 5 V, 4 to 20 mA & 0 to 20 mA (Resistor 250 ohms required for current i/p)
Scale range	-19000 to +19000
Resolution	1 count
Accuracy	±(0.1% of Full Scale +1digit)

Table 1

Operating Range

Type	Range	Resolution
E	-200°C to +1000°C (fixed)	1°C
J	-200°C to +760°C (fixed)	1°C
K	-200°C to +1350°C (fixed)	1°C
T	-200°C to +400°C (fixed)	1°C
B	+450°C to 1750°C (fixed)	1°C
R	0°C to +1750°C (fixed)	1°C

Table 1 (Cont.)

S	0°C to +1750°C (fixed)	1°C
RTD	-200°C to 850°C (fixed)	0.1°C
0 to 5V	-19000 to 19000	1 count
1 to 5V	-19000 to 19000	1 count
4 to 20mA	-19000 to 19000	1 count
0 to 20mA	-19000 to 19000	1 count

- Open sensor upscale /downscale feature for all inputs.
- One shot Calibration for all inputs through front key pad.

OPERATOR TERMINAL MODULE SPECIFICATION

Mechanical Dimensions 96(H) x 192 (W) x 45(D) (all in mm)

Operating Power

Rated Supply Voltage	24V DC
Power Supply capacity	10VA or less
Power Connector	2 terminal Strip

Ambient Conditions

Ambient Temperature	0 to 55 °C
Relative Humidity	0 to 90% (non condensing)

Display 16 x 2 large character LCD display (LCD screen with back-light)

Engineering units	Upto 50 engineering units to select from list

Keypad

Number of keys	24 keys with membrane keypad
12 Numeric keys	Used for inputting Numerical Value
4 Arrow keys	Used to select the required numerical value input field when there is more than one on the screen
3 Menu Keys	Used to Select/ Enter/ Escape menu items
5 Function Keys	Used for various functional operation

Mode & Alarm LED

Power ON LED to indicate unit is in ON condition

4 Alarm LEDs for alarm indication & 1 Fault LED for Fault indication in the system

5 Mode LEDs used while programming/ calibrating/ verifying various parameters

Storage Memory

In-built 2K Bytes EEPROM to store various parameters

Communication

Communication Interface	RS422, 4 wire full duplex communication
Baud Rate	Fixed 19200 bps
Connector	Straight RJ 45 PCB mounted
Protocol	MODBUS RTU

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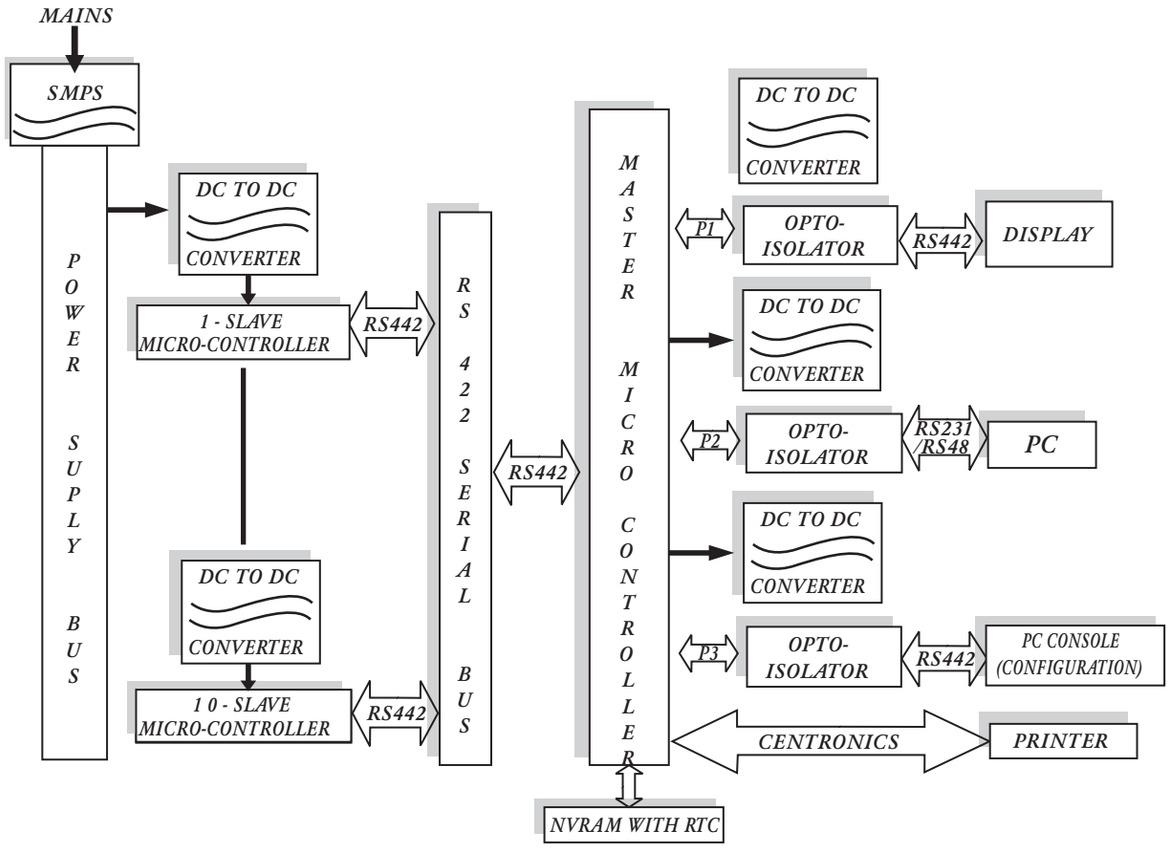
Datalogger (Model 8040)

Internal system architecture



ORDERING CODE

Model	No of Input		Input type/Configuration				Operator Terminal		Aux Output		Signal Termination	
8040	X		X		X		X		X		X	
	A	Sixteen	N	Non Isolated	1	E	N	No	N	None	N	None
	B	Thirty Two	I	Isolated	2	J	1	Separate	1	Relay card	1	Pre-fab cable
	C	Forty Eight			3	K	2	Compact▲	2	OC card	2	Pre-fab cable with DIN terminal module
	D	Sixty Four			4	T						
	E	Eighty			5	B					3	Terminals on chasis*
	F	96			6	R						
	G	112			7	S						
					9	Pt-100, 3W						
					C	4-20mA						
					D	0-20mA						
					E	1-5VDC						
					F	0-5VDC						

** Terminal can be offered on back of chasis, available upto 64 channels only. O/T as separate*

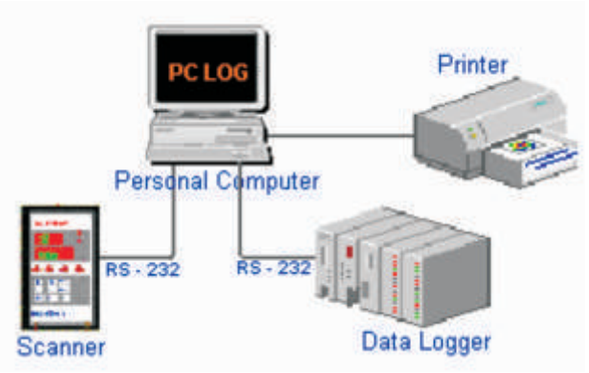
▲Datalogger chasis height will be 6U.

X - Specify from table

Doc.ref.CB-2/8040/R2/0110

PC - Based Hybrid Recorder PCLOG

Introduction



Once data has been acquired, there is often a need to store it for current and future reference.

Conventional analog recorders have had the functions of a data logger added to their capabilities, called "Hybrid recorders". They combine analog trend representations with digital information on the same chart paper.

Today, old traditional paper recorder has been obsolete and alternative electronic methods of data storage utilizing digital computer memory is proved to be an efficient way of recording data. There is now data acquisition hardware and software that can work with standard PCs, making it quite plausible to classify them as recorders or, alternatively, data loggers. These are referred to as PC-based solutions. New technology has made recording data paperless and is a practical reality, with savings in materials and maintenance. This class of instrument mimics conventional trend recorder displays that has the capabilities of a data logger and can export data to a PC or DCS workstation, in real-time or periodically for future analysis. Now, digital computer systems have had the ability to provide useful trend curves on CRT displays, that can be analyzed and printed. Today, a similar approach permits digital inputs to recorders and data loggers to be stored electronically on-board or sent to a remote PC, distributed control system (DCS) workstation, or full-color printer. PCLOG optionally complies to FDA norms of electronic signature (21 CFR, Part 11) for food/ chempharma applications.

Features

PCLOG software monitors through front end multichannel 85XX Scanner, 8040 Data Logger in a process control environment and gives easy access to parameter settings, monitoring, logging data and status of hardware.

- PCLOG software is fully menu driven and user friendly with standard Mouse / Keyboard or Functional Hot Keys.
- Provides alarm annunciation.
- PCLOG provides real time data acquisition and monitoring. The data is displayed in attractive forms like 3D bar graph display, trend curves and large digital display.

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PC - Based Hybrid Recorder PCLOG

Application

Process measurements for variables like temperature, pressure, flow, pH, humidity and engineering applications such as high-speed testing, SPC and other laboratory or off-line uses where a graphic or digital record of selected variables is desired.

Specifications

Display

PCLOG will display real time data in various formats like large digital displays, bar graphs and group displays.

Real Time Trend/ History Trend Display

This shows real time and historical trend of all channels and provides facility for Zoom.

Report

PCLOG provides colorful report in excel for user selectable time period.

Alarm Annunciation

PCLOG provides display of alarm status both as line display and also soft window annunciation.

Utility Page

PCLOG offers various utilities like tag debug, IO device statistics, calculator, notepad for operator log, computer setup, report setup, PC CPU usage and date / time settings.

Benefits

- PCLOG recording system doesn't need any recording pens, paper unlike conventional recording system and is a vendor independent product.
- Recorded data can be stored and maintained for number of months without data loss.
- Recorded data is easily readable since reports are available in form of tabular and graphical formats.
- Interval time of recorded data can be programmed.
- System & menu functions are user friendly.
- Reduced cabling cost and low maintenance, as only one system has to be operated and maintained. instead of multiple recorders.
- System is also available with the facility of supervisory password.
- Recorded data is always maintained in a centralized location for future analysis.

Doc.ref.CB-2/PCLOG/R0/0110

Loop Calibrator (Model TCS 4050 M)

Masibus'M odel TCS4050M is a precision loop calibrator designed to provide significantly extended performance compared to any competitive calibrator with an accuracy of 0.05% of full scale with 1µA resolution. Model TCS4050M can power and read two-wire transmit terfor its calibration or can simulate transmitters to calibrate read out instruments Above feature makes this calibrator most popular amongst the engineers and technicians in the process industry.

Model TCS 4050M Loop Calibrator is a micro-controller based calibrator, capable of measuring and simulating mV and mA signals. 18-bit ADC & 4½ digit LCD display provides high resolution and accuracy for field or laboratory usage. This calibrator does not use any potentiometric knob which are prone to maintenance and drift. It uses digital setting through membrane keys that offers drift free long term performance and stability even in hostile environments.

In mA mode, four operating modes make the product more flexible and versatile. This enables the Model TCS 4050M to calibrate any instrument connected in current loop, hence the name 'Loop Calibrator'. Model TCS 4050M also has simulation facility for mV signal from 0-200mV that can be used to calibrate any other process instruments.

Calibration certificates traceable to national standards are provided with all calibrators. Calibration is carried out in the Masibus' Calibration Lab which has been accredited with ISO 9001- 2008 certification from UL laboratories.

The instrument is powered using rechargeable battery of standard 'AA' size. It is supplied with an external charger and leather carrying case for hands-off field work. Various modes of operation are illustrated on the back cover of the instrument itself for quick reference connection in the field.

Features

- *High accuracy of ±0.05% FS*
- *High resolution1 µA*
- *Display facility in value and %*
- *Potentiometer free digital setting*
- *Bold, 4½ digit LCD display*
- *Loop power measurement facility*
- *2W SIM and READ POWER mode*
- *Preset output for zero/span or in steps of 10% & 25%*
- *Powered by rechargeable battery*
- *Light weight, handy, portable unit*

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Loop Calibrator (Model TCS 4050 M)

4050 M

TECHNICAL SPECIFICATIONS — 4050 M

Range

mV : -20 to 200 mV (250 mV in over range)

mA : 0 to 20 mA (25 mA in over range)

Resolution

mV : 10 μV (100 μV in over range)

mA : 1 μA (10 μA in over range)

Accuracy

mV : ± (0.03% F.S. + 1 count)

mA : ± (0.05% F.S. + 1 count)

Display

4½ Digit 0.5" seven segment LCD

Output Loading

mV : 10 mA

mA : 1000 Ohms at 20 mA with internal battery supply

2400 Ohms at 20 mA with external main supply

Protection

Reverse polarity, current limiting and over voltage

Battery

6 Nos. of 1. 2V rechargeable cells AA size

Battery Life

Measurement mode : 20 Hrs.

20 mA source mode : 4 Hrs.

Battery Charging Time

14 Hrs. for full charge.

LO Bat Indication

Provided

Output Setting

By Key continuous or in steps of 10% or 25%.

Zero/Span Setting

By individual key for quick check.

Operating Temperature

0 to 50 °C

Relative Humidity

0 to 90% RH (non-condensing)

Dimensions

40 mm (H) x 100 mm (W) x 200 mm (L)

Weight Less than 500 gms

Accessories

6 nos. Ni-Cd rechargeable battery

Power adapter for 230VAC

2 sets of test leads & shorting links

Operation manual

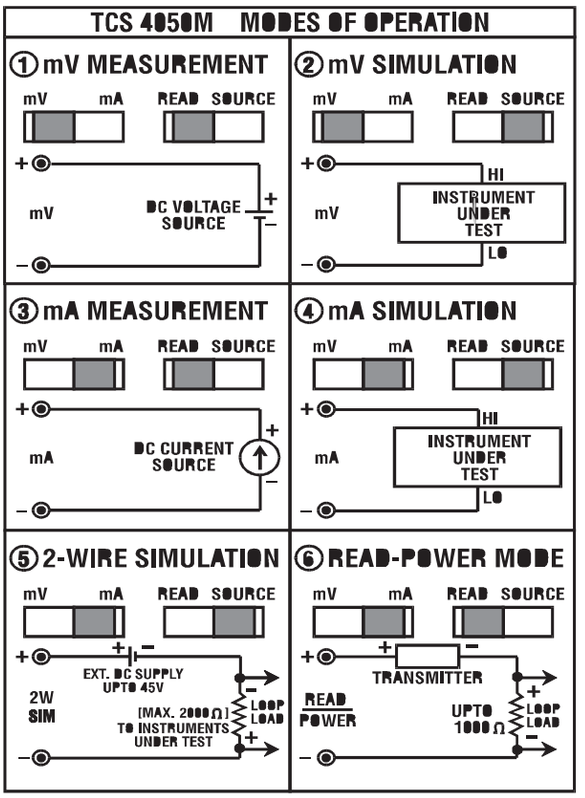
Traceable calibration certificate

Carrying pouch

Re Calibration and training

Masibus CAL-LAB carries out periodic re-calibration of calibrators and also offers calibration training as a professional service for our customers.

MODES OF OPERATION



ORDERING CODE

TCS 4050M	Loop Calibrator

Doc.ref.CB-2/TCS4050M/R2/0110

Thermocouple Calibrator (Model TCS 4070)

Masibus Model 4070 is a micro-controller based thermocouple calibrator. This is an ideal device to handle all of your temperature calibration needs in a truly rugged, low cost package. It combines measurement and simulation of mV, 7 different thermocouples. It provides highly accurate, stable & fast reading, enhancing calibration productivity.

Micro controller and 24 bit ADC is embedded in one silicon package that gives excellent accuracy, resolution & fast response. 16 character x 2 line bold LCD display provides interactive calibration data display and mode programming. It uses membrane switches for setting the output in simulation mode.

Preset value setting is possible in simulation mode. Various setting like low, mid, high and step value can be entered that makes the calibration process very fast and error free. Random value selection is possible in selection mode using key pad. Engineering unit is user selectable between °C or °F. Cold junction compensation for thermocouple is also user selectable between automatic or manual.

The product is designed to guarantee minimum current consumption ensuring optimized battery life. The instrument is powered using rechargeable battery of standard 'AA' size. It is supplied with an external charger and leather carrying case for hands-off field work.

Calibration certificates traceable to national standards are provided with all calibrators. Calibration is carried out in the Masibus' Calibration Lab which has been accredited with ISO 9001- 2008 certification.

Features

- *Micro-controller based thermocouple calibrator*
- *User-friendly menu driven operation*
- *High accuracy & resolution*
- *Digital Simulation- no trim pots*
- *16 character x 2 Line alphanumeric bold LCD display*
- *Measures & simulates TC/ mV*
- *Rechargeable 'AA' size Ni-MH cells*
- *Handy & Portable*
- *Automatic CJC*
- *3 programme preset value in SIM mode*

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Thermocouple Calibrator (Model TCS 4070)

TECHNICAL SPECIFICATIONS	TCS 4070

Display

16 character x 2 Line alphanumeric LCD display

Keyboard

10 key tactile keys

Source & Sense

Thermocouple E, J, K, T, B, R, S

Voltage 0-100 mV DC

Thermocouple & mV Specification

Type	Temp Range °C			Resolution	Accuracy
E-Type	-200 : 1000			0.1 °C	±0.5 °C
J-Type	-200 : 1200			0.1 °C	±0.5 °C
K-Type	-200 : 1370			0.1 °C	±0.5 °C
T-Type	-200 : 400			0.1 °C	±0.5 °C
B-Type	450 : 1820			0.1 °C	±1.0 °C
R-Type	0 : 1750			0.1 °C	±1.0 °C
S-Type	0 : 1750			0.1 °C	±1.0 °C
mV		-9.000	100.000	0.001 mV	±0.010 mV
PT100	-200 to 850			0.1 °C	±0.2 °C sense ±0.5°C source

"QUICK-CHECK" Switches

Low, Mid & High

CJ Compensation

User Selectable - Auto / Manual

Calibration

Calibration of Zero, Span & DAC Output through Software and Key board.
No trim-pots.

Indication

Under and Over Limit Indication

Warm Up Time

15 Minutes maximum for all ranges

Battery

6 Nos. of 1.2V, 1200mAH rechargeable 'AA' size Ni-MH cells

Battery Discharging Time

Sensing mode	Around 8 Hours
Source mode	Around 8 Hours

Battery Charging Time

14 to 16 hours for full charge

BAT indication

"<" indication will display on Last character of First line of the LCD display if battery voltage is below 6.8 V.

">" indication will display on Last character of First line of the LCD display if battery is fully charged (> 7.5 V) or charger is connected to it.

TECHNICAL SPECIFICATIONS	TCS 4070

Data Entry

Through 10 Key keypad.

General

Power Supply	7.2 V, 1200mAH rechargeable Battery
Operating Temperature	0 to 50 °C
Storage Temperature	0 to 60 °C
Relative Humidity	20 to 90% RH non-condensing.
Power consumption	Less than 10 VA

Physical

Case	Black color case of ABS material with IP40 protection
Dimensions	200(L) x 100(W) x 40(H) (all in mm)
Weight	Less Than 500 gms
Charger Jack	At left hand side

Accessories

6 nos. Ni-MH rechargeable battery

Power adapter for 230VAC

2 sets of test leads & shorting links

Operation manual

Traceable calibration certificate

Carrying pouch

Re Calibration and training

Masibus CAL-LAB carries out periodic re-calibration of calibrators and also offers calibration training as a professional service for our customers.

ORDERING CODE

TCS 4070	Thermocouple Calibrator

Doc.ref.CB-2/TCS4070/R3/0110

Universal Calibrator (Model UNICAL 3001M)

Masibus' UNICAL 3001M is a micro-controller based innovative multi function calibrator that combines a total of 16 functions & range. UNICAL 3001M provides a high accuracy, high precision and multi function calibration designed with ease of use concept. It can be used in both laboratory and site calibration purpose with an easy to use concept.

UNICAL 3001M has 5 digit 0.56" RED high efficiency LED display. At the heart of the instrument is an 8-bit micro-controller, an 18-bit serial ADC and indigenously developed dedicated software, that makes this calibrator an unique and a highly reliable product. UNICAL 3001M goes through an auto calibration cycle every 3 minutes during which instrument reading will freeze for 2 seconds. Same 'Auto Cal' loop is repeated when a new range is selected. This 'Auto Cal' cycle corrects for drifts in instrument because of self heating.

Facilities like independent settings for zero/span, switch selectable digital nulling for offset cancellation and differential measurement enables higher calibration functionality. UNICAL 3001M provides additional facility to measure/simulate 2 user defined thermocouples as an option. UNICAL 3001M is equipped with rechargeable battery with built in charger that the calibrator to perform onsite calibration and provides full 24 VDC compliance voltage even in battery mode in the field.

UNICAL 3001M has versatile feature for calibrating and checking temperature indicator / controllers, recorders, temperature transmitters, single conditioners, etc. with RTD and thermocouple source / measure capability. It can also source mV signals for load cell amplifiers and can simulate resistance for position indicators.

Features

- *Micro-controller based multi function calibrator*
- *Unique 'Auto Cal' & 'Auto Zero' function*
- *5 digit, 0.56" RED LED display*
- *16 calibration function*
- *User friendly operation using dedicated switches*
- *Special calibration function for Cu-53, 2 custom T/C & resistance simulation*
- *Mains-Cum-Rechargeable battery operated*

masibus® Advanced Automation - Sure Solutions

Universal Calibrator (Model UNICAL 3001M)

TECHNICAL SPECIFICATIONS 3001M

Display

5 Digit, 0.56" red high efficiency LED.

Rechargeable Battery

Built-in 7.2V, 2.2 AH Power Pack

Battery Operation

Approximately 5 Hours in measurement mode or 4 Hours with 20mA output.

Battery charging time

14 Hours for full charge.

Lo Bat indication provided.

Protection

Voltage Source Short Circuit

Current Source Open Circuit

Input impedance

Greater than 10 MΩ for mV, V, t/c. 10Ω in mA.

Operating Temperature

0 to 55 °C

Humidity Range

0 to 80% RH non-condensing

Cold Junction Compensation

Automatic from 0 °C to 50 °C in both measure and simulation mode. C J C switch off with 0 °C reference provided.

Temperature Coefficient

±0.002% Rdg / °C

Thermocouple Linearisation

ANSI Standard.

Sampling Time

400 mSec.

Enclosure

General Purpose.

TECHNICAL SPECIFICATIONS 3001M

Standard Accessories

Carrying Case, 2 sets test leads, 2 shorting links, RTD Simulator Module and Instruction Manual.

Mains Power Supply

230/110V AC +/- 10%, 50 Hz (Please specify)

Dimension

240(W) X 135(H) X 185(D) (all in mm)

OPTIONS

- Additional facility to Measure / Simulate 2 user defined Thermocouples.
- Panel mounting kit.

ORDERING CODE

Model	Option 1		Mounting	
3001M	X		X	
	N	None	T	Table-top
	1	2 nos. custom T/C*	P	Panel

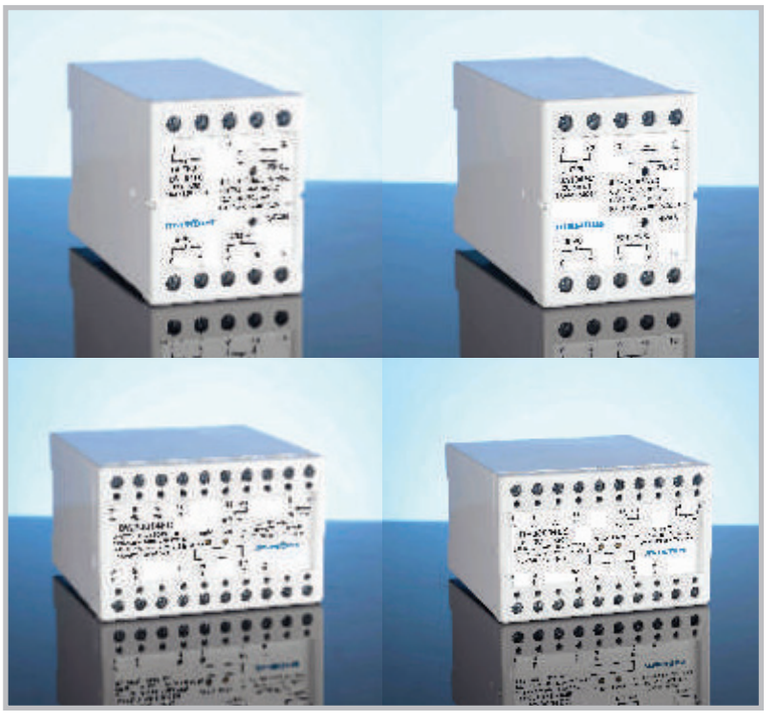
X - Specify from table
* - Please specify T/C types

FUNCTION	RANGE	RESOLUTION	ACCURACY	SOURCE LOADING CAPABILITY
Amb	0 to 50 °C	0.1 °C	± (0.2 °C + 1 Count)	---
20mV	0 to +20mV	1µV	± (0.03% FS + 1 Count)	10mA max.
200mV	0 to +200mV	10µV	± (0.03% FS + 1 Count)	10mA max.
2V	0 to +2V	0.1mV	± (0.03% FS + 1 Count)	10mA max.
10V	0 to +10V	1mV	± (0.03% FS + 1 Count)	10mA max.
20mA	0 to +20mA	1µA	± (0.03% FS + 1 Count)	Compliance Voltage 24V DC
60mA	0 to +60mA	10µA	± (0.03% FS + 1 Count)	Compliance Voltage 24V DC
B type	450 to 1750 °C	0.1 °C	± (2.0 °C + 1 Count)	10mA max.
E type	-200 to 1000 °C	0.1 °C	± (0.5 °C + 1 Count)	10mA max.
J typ	-200 to 1200 °C	0.1 °C	± (0.5 °C + 1 Count)	10mA max.
K type	-200 to 1370 °C	0.1 °C	± (0.5 °C + 1 Count)	10mA max.
R type	0 to 1750 °C	0.1 °C	± (1.0 °C + 1 Count)	10mA max.
S type	0 to 1750 °C	0.1 °C	± (1.0 °C + 1 Count)	10mA max.
T type	-160 to 400 °C	0.1 °C	± (0.5 °C + 1 Count)	10mA max.
Pt - 100	-200 to 850 °C	0.1 °C	± (0.5 °C + 1 Count)	0.5 mA Injection Current
CU - 53	-100 to 200 °C	0.1 °C	± (0.5 °C + 1 Count)	0.5 mA Injection Current
2K Ohm	0 to 2K Ohm	0.1 Ohm	± (0.03% FS+ 1 Count)	0.5 mA Injection Current

Note : For mV, V and 20 mA ranges 25% over range provided.

Doc.ref.CB-2/3001M/R2/0110

AC Line Transducer



Masibus manufactures high quality power transducers of various types to help you manage and conserve electricity. All electrical parameters such as current, voltage, active power, reactive power, energy, frequency and power factor can be accurately measured. A corresponding linearized signal is then transmitted for various applications such as SCADA, S/S automation, energy measurement, remote indication, check metering etc.

Power transducer series offers an economical and accurate means of current & voltage measurement on systems where the waveform is a pure sine wave. Transducers are calibrated to true RMS value of the sine wave. They can also be used with distorted waveforms where high accuracy is not required.

AC line transducers are having its application to interface with RTUs. Masibus make current & voltage transducers are also available with dual output. Transducers are available in 1Ø / 3Ø versions. It provides accuracy up to 0.25% FS with up to 2 KV isolation. Hardware calibration is done through trim-pot.

Since 1994 Masibus has supplied power transducers to hundreds of utilities, industrial plants and commercial establishments all over the world. All transducers perform with exceptional accuracy, repeatability and reliability. In addition to being most accurate, our transducers are equally preferred by OEMs/ end users to other makes for their excellent stability over a long period of operation. This world class technology now comes to you at a very competitive price.

AC line transducers are available as current, voltage, frequency, power, power factor and energy in 1Ø / 3Ø configuration.

Features

- *High accuracy class 0.25%*
- *Confirms to IEC 60688*
- *Power transducers for all requirements*
- *Excellent long term stability*
- *Low burden*
- *Transient protected*
- *Both 1-ph & 3-ph versions available*
- *Good isolation & impulse resistance*
- *Minimum ripple at the output*
- *Fast response*
- *Full power factor range operation*
- *ABS DIN rail mounting*

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AC Line Current/Voltage

TECHNICAL SPECIFICATIONS	CURRENT/VOLTAGE TRANSDUCER
General specification	
Temperature	0 to 55°C
Humidity	40-90% RH (non condensing)
Terminations	Metal Screw can accept up to 2.5 square mm wire
Mounting	DIN rail mounting
Case material	ABS, Light gray. (RAL 7035) with fireproofing finish
Case Size	Width-55 mm, Height-75 mm, Depth-110 mm (1Ø)
Circuit boards	Copper cladded laminate FR-4 Grade epoxy glass
Connection	Power/ Input/ Output 1/ Output 2
AC Current Transducers Specifications	
Input Signal	0-5A, 0-1A, 0-2A.
Output Signal	0-1mA, 0-3mA, 0-5mA, 0-10mA, 4-20mA, 0-1V, 0-5V, 0-10V, 1-5V
Calibration	Zero & Span of output can be adjusted by Trim pots at the front
Loading	
For Current	See OUTPUT in Model Identification
For Voltage	See OUTPUT in Model Identification
Output Accuracy	±0.25% of full scale Output Ripple < 75mV Peak
Response Time	< 400 ms
Temp. Effect	Less than ±0.01% per °C
Isolation	2.0KV AC for one minute Input/Output/Power/Case
Input Burden	Input burden is 0.2 VA at full scale regardless of option
Weight	400 gms
AC Voltage Transducers Specifications	
Input Signal	0-150V, 0-90V, 0-300V, 0-450V
Output Signal	0-1mA, 0-3mA, 0-5mA, 0-10mA, 4-20mA, 0-100mV 0-1V, 0-5V, 0-10V, 1-5V
Calibration	Zero & Span of output can be adjusted by Trim pots at the front
Loading	
For Current	See OUTPUT in Model Identification
For Voltage	See OUTPUT in Model Identification
Output Accuracy	±0.25% of full scale Output Ripple < 75mV Peak
Response Time	< 400 ms
Temp. Effect	Less than ±0.01% per °C
Isolation	2.0KV AC for one minute Input/Output/Power/Case
Input Burden	Input burden is 0.6 VA at full scale regardless of option
Weight	400 gms

TECHNICAL SPECIFICATIONS	CURRENT/VOLTAGE TRANSDUCER	
Enclosure ABS DIN, Rail Mount		
AC Current Transducer		DA
AC Voltage Transducer		DV
Configuration		
Single Phase		1
Three Phase*		3
Input		
Current	Voltage	
0-5A	0-150V	0
0-1A	0-90V	1
0-2A	0-300V	2
	0-450V	3
Output		
0-1mA	(0-10,000 Ohms)	0
0-3mA	(0-3,300 Ohms)	1
0-5mA	(0-2,000 Ohms)	2
0-10mA	(0-1,000 Ohms)	3
4-20mA	(0-750 Ohms)	4
0-1V	(180 Ohms minimum)	6
0-5V	(500 Ohms minimum)	7
0-10V	(1000 Ohms minimum)	8
1-5V	(500 Ohms minimum)	9
Special		X
Aux power		
110 VAC Aux Power		EC
230 VAC Aux Power		FC
DC Aux Power 24VDC		K1
DC Aux Power 48VDC		K2
DC Aux Power 125VDC		K3
DC Aux Power 220VDC		K4
Special		X

* Self power only.

NO. of Outputs	
Single	Keep Blank
Dual	D

For Example: DA-104-FC-D is the ordering code for 1-phase AC current transducer in a DIN rail, with a 0-5A input, a 4-20mA dual output & 230 VAC aux power.

NOTE:
1. Output code 4 & 9 and dual output is available only with 1-phase configuration.
2. Output code 4 & 9 is & dual output available only with Aux supply option.

Power Transducer

TECHNICAL SPECIFICATIONS	POWER TRANSDUCER
Type	Watt,VA,VAR
Configuration	Three phase, 3 wire, 2 element 3 phase, 4 wire, 3 element
Input Voltage	208 to 240 V, 63 to 69 V 100 to 120 V, 460 to 480 V
Input Current	0 to 5 Amp 0 to 1 Amp
Accuracy	Watt:0.19% of Rdg/Cosf ±0.01% of FS VAR:0.19% of Rdg/sinf ±0.01% of FS VA:0.19% of Rdg ±0.01% of FS
Output	**0** to ± 1mA (0-10000 Ohms) 0 to ± 3 mA (0-3000 Ohms) 0 to ± 5 mA (0-2000 Ohms) 0 to ± 10 mA (0-1000 Ohms) 4 to 20 mA (0-750 Ohms)* 0 to ± 100 mV (20 Ohms - 8) 0 to ± 1 V (200 Ohms - 8) 0 to ± 5 V (1000 Ohms - 8) 0 to ± 10 V (2000 Ohms - 8) 1 to 5 V (1000 Ohms - 8)* *Auxiliary power required for these outputs
Calibration	Hardware - through Trim Pot
Stability	0.2% per year
Auxiliary Power Supply	230VAC / 110VAC, 50Hz
Environmental Conditions	0 to 55°C, 0 to 95% non-condensing
Temperature Co-effcient	± 0.005% per °C
Case	ABS Din Rail Mount
Power factor range	any
Operating frequency	50Hz/60Hz
Dielectric Test	2 KV AC for 1 minute
Surge Withstand	EN61000-4-5
Response Time	To 90% : 200 ms maximum To 99% : 400 ms maximum
Calibration Adjustment	Full scale ±10%, Zero ±2%
Operating frequency	Nominal ± 10% in accordance with IEC 688
Dimension	106W X 70H X 110D mm
Different model	Self powered /externally powered

POTENTIAL TABLE

Nominal input	**100-120v 63-69V**
Potential range with accuracy(self-powered)	85-150V 50-90 V
Potential range with accuracy(external-powered)	10-150V 10-90 V
Maximum burden at nominal input	0.1 VA* 0.1 VA*
Potential overload continuous	180V 100V
Nominal input	**208-240v 460-480V**
Potential range with accuracy(self-powered)	170-300V 325-575 V
Potential range with accuracy(external-powered)	20-300V 30-575 V
Maximum burden at nominal input	0.1 VA* 0.1 VA*
Potential overload continuous	350V 700V

* self powered units have a burden of < 3 VA across either ΦA-N,or ΦA- ΦB

CURRENT TABLE

Input	**0-5A**
Over range with accuracy	10A
Maximum burden	0.5 VA
Overload continuous	15A
Overload 10 s/h	30A
Overload 1 s/h	200A

Input	**0-1A**
Over range with accuracy	2A
Maximum burden	0.5 VA
Overload continuous	3A
Overload 10 s/h	6A
Overload 1 s/h	100A

OUTPUT TABLE

Range full Scale	**Output loading**	**Compliance or maximum current**
0 to ±1 mA	0-10000 Ohms	± 11 V
0 to ±3 mA	0-3000 Ohms	± 11 V
0 to ±5 mA	0-2000 Ohms	± 11 V
0 to ±10 mA	0-1000 Ohms	± 11 V
4 to 20 mA Unidirectional	0-750 Ohms	15 V
0 to ±100 mV	20 Ohms - 8	5 mA
0 to ±1 V	200 Ohms - 8	5 mA
0 to ±5 V	1000 Ohms - 8	5 mA
0 to ±10 V	2000 Ohms - 8	5 mA
1 to 5 V	1000 Ohms - 8	1000 Ohms - 8

Standard Calibration of watts.VAR,VA per element

A\V	100-120V	208-240V
0-5A	500	1000
0-1A	100	200

ORDERING INFORMATION

Enclosure	ABS DIN rail mount	D
Model	Watt	W
	VA	VA
	VAR	R
Configuration	3-element (3-ph, 4 wire)	30
	2 element (3ph, 3 wire)	20
Input nominal voltage	100 to 120 V	0
	63 to 69 V	1
	208 to 240 V	2
	415 to 480 V	3
Input current	0 to 5 A	0
	0 to 1 A	1
Output	0 to ±1 mA	0
	0 to ±3 mA	1
	0 to ±5 mA	2
	0 to ±10 mA	3
	4 to 20 mA Unidirectional	4
	0 to ±100 mV	5
	0 to ±1 V	6
	0 to ±5 V	7
	0 to ±10 V	8
	1 to 5 V	9
	Special	X
Auxilary Power Supply	120VAC	EC
	230VAC	FC
	DC Aux 24VDC	K1
	DC Aux Power 48VDC	K2
	DC Aux Power 125VDC	K3
	DC Aux Power 220VDC	K4
	Special	X
No. of output	single	Keep blank
	Dual	D

SPECIAL CALIBRATION INSTRUCTIONS

Please specify: 1. CT Ratio 2. PT Ratio 3. Desired Full Scale Calibration in kW, kVAR, kVA

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AC Line Frequency & Power Factor Transducer

Specifications

Accuracy	0.05% of Center Frequency
Temperature Range	-20 °C to +70 °C
Temp. Co-efficient	± 0.001% per°C,10ppm typical
Operating Humidity	0-95% non-condensing
Power factor range	Any
operating Voltage Range	-30% +25% of Nominal
Dielectric Test	2kv for 1 minute
Burden	1.5 VA(most options)
Surge Withstand	ANSI C37.90a(IEEE 472); BEAMA 219;special 5 KV
Response Time	200 ms to 90% 400 ms to 99%
Calibration Adjustment	± 10% standard
Zero Adjustment	± 2% standard

ORDERING CODE

Enclosure	ABS ,Din Rail mount	D
Model	Frequency	H
Center frequency	50 Hz	5
	60 Hz	6
	Special	X
Frequency Span	**50/60Hz**	
	± 1 Hz	1
	± 2 Hz	2
	± 3 Hz	3
	± 4 Hz	4
	± 5 Hz	5
	± 6 Hz	6
	± 7 Hz	7
	± 8 Hz	8
	± 9 Hz	9
	± 10 Hz	0
	special	X
Nominal Input volatge	120 VAC	0
	69 VAC	1
	240 VAC	2
	Special	X
Output	0 to 1 mA(0-10000 Ohms)	0
	0 to ±1 mA(0-10000 Ohms)	1
	0 to ±0.5 mA(0-20000 Ohms)	2
	0 to ±50 mV(10 Ohms min.)	3
	0 to ±100 mV(20 Ohms min)	4
	0 to ±1 V(200 Ohms min.)	5
	0 to ±10 V(2000 Ohms min.)	6
	1 to 5 V(1000 Ohms min)*	7
	4 to 20 mA(0-750 Ohms)*	8
	0 to ±10 mA(0-1000 Ohms)	9
	special	X
	*with aux power only	
Auxilary Power Supply	Self power	keep blank
	120VAC	E
	230VAC	F
	Dc Aux Power 24 VDC	K1
	Dc Aux Power 48 VDC	K2
	Dc Aux Power 125 VDC	K3
	Dc Aux Power 220 VDC	K4
No of output		
	Single	keep blank
	Dual	D

Specifications

Accuracy	0.25% of FS (@25°C + 2 °C)
Temperature Range	-20 °C to +70 °C
Temp. Co-efficient	± 0.001% per°C,10ppm typical
Operating Humidity	0-95% non-condensing
Power factor range	Any,PF as selected by part no.
Output ripple peak	<0.5% of full scale
Burden	current :0.5 VA(most options) Voltage:3.5 VA nominal
Overload	current:3xF.S cont.,250 A for 1 s/hr. Voltage:1.2 x F.S cont
Surge Withstand	ANSI C37.90a(IEEE 472); BEAMA 219;special 5 KV
Response Time	200 ms to 90% 400 ms to 99%
Calibration Adjustment	± 10% standard
Zero Adjustment	± 2% standard

ORDERING CODE

Enclosure	ABS, Din Rail mount	D
Model	Power factor	PF
Nominal Input volatge	120V	0
	240V	2
	Special	X
Nominal Input Current	1-5A	0
	0.2-1A	1
	Special	X
Power factor code	± 1.0	0
	± 0.7	1
	± 0.5	2
	± 0.3	3
	± 0.2	4
	Special	x
Output	0 to 1 mA(0-10000 Ohms)	0
	0 to ±1 mA(0-10000 Ohms)	1
	0 to ±0.5 mA(0-20000 Ohms)	2
	0 to ±50 mV(10 Ohms min.)	3
	0 to ±100 mV(20 Ohms min)	4
	0 to ±1 V(200 Ohms min.)	5
	0 to ±10 V(2000 Ohms min.)	6
	1 to 5 V(1000 Ohms min)*	7
	4 to 20 mA(0-750 Ohms)*	8
	0 to ±10 mA(0-1000 Ohms)	9
	special	X
	*with aux power only	
Auxilary Power Supply	Self power	keep blank
	120VAC	E
	230VAC	F
	Dc Aux Power 24 VDC	K1
	Dc Aux Power 48 VDC	K2
	Dc Aux Power 125 VDC	K3
	Dc Aux Power 220 VDC	K4
No of Output	Single	keep blank
	Dual	D

Note: When you select PF + 0.3,output 4 mA comes at PF -0.7,12mA comes at PF 1 & 20 mA comes at PF +0.7

When you select PF + 0.7,output 4 mA comes at PF -0.3,12mA comes at PF 1 & 20 mA comes at PF +0.3

Doc.ref.CB-2/DA/DV/DW/DVA/DH/DPF/R3/0110

Power Meter (Model 2150)

Masibus Model 2150 Power Meter is a solid state design, which is a complete LT/HT line measurement solution for the monitoring of three phase AC supply including all types of energies. The 2150 Power Meter is based on ASIC and Micro controller, with a high degree of programmability.

The meter meets the accuracy requirements of IS 13779/IEC 61036, and has been certified by the ERDA. This model is available for class 1 or class 0.5 accuracy. Maximum demand feature is available with class 1 accuracy also.

The meter can be programmed to operate as an intelligent electronic device (IED) for measurement and storage device with serial communication making it an ideal data source for EMS, SCADA, PLCs and BMS system.

The meter is supplied pre-programmed for operation and ready for use. Model 2150 power meter stores all its energy data and programming parameter into non-volatile memory using EEPROM. This power meter measures 51 electrical parameters of 3 phase AC line and displays using 19 screens which is selectable from front keys.

Model 2150 has auto scaling facility while measuring energy from Kilo to Mega to Giga. Instrument can be self or auxiliary powered with very low burden. Calibration can be done using front keys or through PC software.

Model 2150 has digital input and output facility. Programmable pulse output can be used for KWH (import-export), KVARH (lag-lead) and KVAH. Programmable pulse input can be used to totalize 3rd party energy device.

The CT & PT ratio (primary) can be programmed at site using front membrane key. Model 2150 is supplied packaged in panel mount or back panel DIN rail version.

Features

- *Accuracy class 1.0 as per IS13779/ IEC 61036 (class 0.5 option)*
- *True four quadrant measurement*
- *Self/Aux powered*
- *Four row back-lit LCD display*
- *51 Parameters of 3Ø AC Line using 19 display screens*
- *AUTO-SCALING from Kilo to Mega to Giga watt*
- *Programmable pulse input & output*
- *Calibration using front keys/ PC*
- *Isolated RS 485 (MODBUS-RTU protocol)*

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Power Meter (Model 2150)

TECHNICAL SPECIFICATIONS	2150
Nominal Voltage Input	
Direct connection voltage	Between 57.8V and 550V
Standard Voltage offered	63.5/110V,69.3/120V,120/208V,220/380V, 230/400V,240/415V,275/476V for 3ph4w 110V,120V,380V,400V, 415V,440V,476V for 3ph 3w
Accuracy Range	50 – 115% of nominal voltage
Burden	< 2.5 VA per phase
Overload	1.2x nominal continuous
PT Ratio	1 to 9999.999 programmable (primary)
Input wire gauge	12 AWG
Nominal Input Current	1 or 5 Amp.
Accuracy Range	5 – 120% nominal
Burden	< 0.5 VA per phase
Overload	4.0x nominal continuous 20.0x nominal for 1 sec.
CT Ratio	1 to 9999.999 programmable (primary)
Starting current	0.4% of nominal Current. (Class 1.0)
Input wire gauge	12 AWG
Frequency	50Hz / 60Hz range ± 5.0Hz
Measured Parameters	
Voltage	L1-L2,L2-L3,L1-L3 & average (3 ph 3 w) & (3 ph 4 w) L1-N,L2-N,L3-N & average (1ph & 3 ph 4 w)
Amps	L1, L2, L 3 & Average. (3 ph 3 w) & (3 ph 4 w) & Neutral Current. (3 ph 4 w)
Frequency	System Frequency
Power Factor	Per Phase P.F & Avg P.F
Active Power	Per Phase Watts & Total Watts (W, kW & MW)
Reactive Power	Per Phase VAR & Total VAR (VAR, kVAR, MVAR)
Apparent Power	Per Phase VA & Total VA (VA, kVA & MVA)
Active Energy	Per Phase & Total Active Energy for Import & Export.(separate) (Wh, kWh , MWh & GWh)
Reactive Energy	Per Phase & Total Reactive Energy For lagging & leading. (separate) (VARh, kVARh, MVARh & GVARh)
Apparent Energy	Per Phase & Total Apparent Energy (VAh, kVAh , MVAh & GVAh)
Auxiliary Power	No External power is required. (Draws power from the voltage signal inputs)
System	Single Phase 3 phase 3 wire unbalanced load 3 phase 4 wire unbalanced load
Accuracy	
Volt	1% rdg ± 1 dgts.
Current	1% rdg ± 2 dgts.
Frequency	0.1Hz ± 1 dgts.
Power Factor	1% rdg ± 2 dgts.(For 0.5 Lag - 1.0 - 0.8 Lead)
Active Power	1% rdg ± 2 dgts.
Reactive Power	2% rdg ± 2 dgts.
Apparent Power	1% rdg ± 2 dgts.
Active Energy	Class 1.0 (IS 13779/IEC 1036)
Reactive Energy	Class 2.0 (IEC 1268)
Apparent Energy	Class 1.0

TECHNICAL SPECIFICATIONS	2150
Output Relay	Watt/VAR/VA-SPNO
AC rating	250V, 5 Amp
DC rating	+ or - 30V, 5A
Pulse Output	WH/VARH/VAH - SPNO
AC rating	200V, 100mA, Resistive
DC rating	± 200V, 100mA, Resistive
Pulse Rate	Programmable from 1 to 9999 pulse per KWH[I]/KWH[E]/KVARLH/ KVARCH/ KVAH of total
Pulse duration	80 mS ± 10%
Communication Output	
Serial port.	RS485
Baud rate	Selectable. 4800/9600/19200
Start bit	1
Stop bit	1
Protocol	MODBUS - RTU
Environmental	
Working temp.	0 to 55 °C.
Storage temp.	10 to 70 °C.
Temperature Coeff.	IS-13779
Relative humidity	0 - 95% non-condensive
Warm up time	5 min
Enclosure	
Mounting	Panel/ DIN rail (DIN rail version is without display)
Enclosure	96 x 96 x 110 mm
Material	Noryle SE1 GFN1
Terminals	Barrier(Feed through) type Screw Terminals
Accessory	2 Panel mount clamps
Weight	500 gms
Isolation	All Inputs and Outputs are galvanically isolated to 2000 Volts AC.
Burden	<5 VA
Sensing Method	True RMS
	Sampling at 320k sample per second on all channel measurement reading simultaneously.
Update Rate	320ms

ORDERING CODE

Model 2150

CT Ratio		PT Ratio		Mounting		Accuracy		Power		Output	
X		X		XX		X		X		X	
1	1A	1	63.5/110V - 3Ø 4W	P0	Panel	1	Class 1.0	1	Self power	1	Pulses
2	5A	2	69.3/120V - 3Ø 4W	D0	DIN rail	2	Class 0.5	2	Aux power	2	Relay
		3	120/208V - 3Ø 4W								
		4	220/380V - 3Ø 4W								
		5	230/400V - 3Ø 4W								
		6	240/415V - 3Ø 4W								
		7	275/476V - 3Ø 4W								
		A	110V - 3Ø 3W								
		B	120V - 3Ø 3W								
		C	380V - 3Ø 3W								
		D	400V - 3Ø 3W								
		E	415V - 3Ø 3W								
		F	440V - 3Ø 3W								
		G	476V - 3Ø 3W								

X - Specify from table

Doc.ref.CB-2/2150/R1/0110

Energy Meter (Model 2110)

Masibus Model 2110 single phase Energy Meter is a solid state design, which is a complete LT/HT line measurement solution for the monitoring of single phase AC supply including all types of energies. The 2110 Power Meter is based on ASIC and Micro controller, with a high degree of programmability.

The meter meets the accuracy requirements of IS 13779/IEC 61036, and has been certified by the ERDA. This model is available for class 1 .

The meter can be programmed to operate as an intelligent electronic device (IED) for measurement and storage device with serial communication making it an ideal data source for EMS, SCADA, PLCs and BMS system.

The meter is supplied pre-programmed for operation and ready for use. Model 2110 power meter stores all its energy data and programming parameter into non-volatile memory using EEPROM. This power meter measures electrical parameters of 1 phase AC line and displays it, which is selectable from front keys.

Model 2110 has auto scaling facility while measuring energy from Kilo to Mega to Giga. Instrument can be self or auxiliary powered with very low burden. Calibration can be done using front keys or through PC software.

Model 2110 has digital input and output facility. Programmable pulse output can be used for KWH (import-export), KVARH (lag-lead) and KVAH. Programmable pulse input can be used to totalize 3rd party energy device.

The CT & PT ratio (primary) can be programmed at site using front membrane key. Model 2110 is supplied in panel mount.

Features

- *Accuracy class 1.0 as per IS13779/ IEC 61036.*
- *True RMS sensing on both channels.*
- *Self/Aux powered*
- *2 X 16 back-lit LCD display*
- *14 Parameters of 1Ø AC Line using 14 display screens*
- *AUTO-SCALING from Kilo to Mega to Giga watt*
- *Programmable pulse input & output*
- *Calibration using front keys/ PC*
- *Isolated RS 485 (MODBUS-RTU protocol)*

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Energy Meter (Model 2110)

TECHNICAL SPECIFICATIONS	2110
Nominal Voltage Input	
Direct connection voltage	Between 57.8V and 275V
Standard Voltage offered	240 V
Accuracy Range	50 – 115% of nominal voltage
Burden	< 2.5 VA per phase
Overload	1.2x nominal (continuous)
PT Ratio	1 to 9999.999 programmable (primary)
Input wire gauge	12 AWG
Nominal Input Current	1,5 or 10 Amp.
Accuracy Range	5 – 120% nominal
Burden	< 0.5 VA per phase
Overload	20 Amp. max (continuous)
CT Ratio	1 to 9999.999 programmable (primary)
Starting current	0.4% of nominal Current. (Class 1.0)
Input wire gauge	12 AWG
Frequency	50Hz / 60Hz range ± 5.0Hz
Measured Parameters	
Voltage	single phase
Amps	single phase
Frequency	System Frequency
Power Factor	P.F
Active Power	Watts (W, kW & MW)
Reactive Power	VAR (VAR, kVAR, MVAR)
Apparent Power	VA (VA, kVA & MVA)
Active Energy	Total Active Energy for Import & Export.(separate)
Reactive Energy	Total Reactive Energy For lagging & leading. (separate) (VARh, kVARh, MVARh & GVARh)
Apparent Energy	Total Apparent Energy (VAh, kVAh , MVAh & GVAh)
Auxiliary Power	No External power is required. (Draws power from the voltage signal inputs)
System	Single Phase
Accuracy	
Volt	1% rdg ± 1 dgts.
Current	1% rdg ± 2 dgts.
Frequency	0.1Hz ± 1 dgts.
Power Factor	1% rdg ± 2 dgts.(For 0.5 Lag - 1.0 - 0.8 Lead)
Active Power	1% rdg ± 2 dgts.
Reactive Power	2% rdg ± 2 dgts.
Apparent Power	1% rdg ± 2 dgts.
Active Energy	Class 1.0 (IS 13779/IEC 1036)
Reactive Energy	Class 2.0 (IEC 1268)
Apparent Energy	Class 1.0

TECHNICAL SPECIFICATIONS	2110
Output Relay	W/VAR/VA - SPNO
AC rating	250 V, 2A (AC)
DC rating	± 30 V, 2A (DC)
Pulse O/p	
AC rating	175V,170mA Resistive
DC rating	± 250V, 70 mA Resistive
Pulse Rate	1 to 9999 pulses per selected type
Pulse duration	80 mS ± 10%
Communication Output	
Serial port.	RS485 Multidrop
Baud rate	Selectable. 4800/9600/19200
Start bit	1
Stop bit	1
Protocol	MODBUS - RTU
Isolation	2 KV
Environmental	
Working temp.	0 to 55 °C.
Storage temp.	-10 to 70 °C.
Temperature Coeff.	IS-13779
Relative humidity	30 - 95% RH-non-condensive
Warm up time	5 min
Enclosure	
Mounting	Panel mounting
Enclosure	96 x 96 x 74.4 mm
Material	ABS
Terminals	Barrier(Feed through) type Screw Terminals
Accessory	2 Panel mount clamps
Weight	300 gms
Display	2x16 Backlite LCD module with 5.56 mm character height
Burden	<5 VA
Sensing Method	True RMS sensing on both channels
Update Rate	320ms

ORDERING CODE

Model 2110				
CT Ratio		Auxiliary Output		
X		X	X	X
1	1A	Pulse	Relay	RS 485
2	5A	N	N	N
3	10A	N	N	Y
		N	Y	N
		N	Y	Y
		Y	N	N
		Y	N	Y
		Y	Y	N
		Y	Y	Y

X - Specify from table

Doc.ref.CB-2/2110/R0/0110

Energy Meter (Model 2130)

Masibus Model 2130 Energy Meter is a solid state design, which is a complete LT/HT line measurement solution for the monitoring of three phase AC supply including all types of energies. The 2130 Power Meter is based on ASIC and Micro controller, with a high degree of programmability.

The meter meets the accuracy requirements of IS 13779/IEC 61036, and has been certified by the ERDA. This model is available for class 1.

The meter can be programmed to operate as an intelligent electronic device (IED) for measurement and storage device with serial communication making it an ideal data source for EMS, SCADA, PLCs and BMS system.

The meter is supplied pre-programmed for operation and ready for use. Model 2130 power meter stores all its energy data and programming parameter into non-volatile memory using EEPROM. This power meter measures electrical parameters of 3 phase AC line and displays which is selectable from front keys. Battery backup is not required for Power Meter 2130.

Model 2130 has auto scaling facility while measuring energy from Kilo to Mega to Giga. Instrument can be self or auxiliary powered with very low burden. Calibration can be done using front keys or through PC software.

Model 2130 has digital input and output facility. Programmable pulse output can be used for KWH (import-export), KVARH (lag-lead) and KVAH. Programmable pulse input can be used to totalize 3rd party energy device.

The CT & PT ratio (primary) can be programmed at site using front membrane key. Model 2130 is supplied in panel mount version.

Features

- *Accuracy class 1.0 as per IS13779/ IEC 61036 (class 0.5 option)*
- *True four quadrant measurement*
- *Self/Aux powered*
- *Four row back-lit LCD display*
- *51 Parameters of 3Ø AC Line using 19 display screens*
- *AUTO-SCALING from Kilo to Mega to Giga watt*
- *Programmable pulse input & output*
- *Calibration using front keys/ PC*
- *Isolated RS 485 (MODBUS-RTU protocol)*

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Energy Meter (Model 2130)

TECHNICAL SPECIFICATIONS	2130
Nominal Voltage Input	
Direct connection voltage	Between 57.8V and 550V
Standard Voltage offered	63.5/110V,69.3/120V,120/208V,220/380V, 230/400V,240/415V,275/476V for 3ph4w
	110V,120V,380V,400V, 415V,440V,476V for 3ph 3w
Accuracy Range	50 – 115% of nominal voltage
Burden	< 2.5 VA per phase
Overload	1.2x nominal continuous
PT ratio	1 to 9999.999 programmable (primary)
Input wire gauge	12 AWG
Nominal Input Current	1 or 5 Amp.
Accuracy Range	5 – 120% nominal
Burden	< 0.5 VA per phase
Overload	4.0x nominal continuous
	20.0x nominal for 1 sec.
CT ratio	1 to 9999.999 programmable (primary)
Starting current	0.4% of nominal Current. (Class 1.0)
Input wire gauge	12 AWG
Frequency	50Hz / 60Hz range ± 5.0Hz
Measured Parameters	
Voltage	L1-L2,L2-L3,L1-L3 & average (3 ph 3 w) & (3 ph 4 w)
	L1-N,L2-N,L3-N & average (1ph & 3 ph 4 w)
Amps	L1, L2, L 3 & Average. (3 ph 3 w) & (3 ph 4 w) & Neutral Current. (3 ph 4 w)
Frequency	System Frequency
Power Factor	Per Phase P.F & Avg P.F
Active Power	Per Phase Watts & Total Watts (W, kW & MW)
Reactive Power	Per Phase VAR & Total VAR (VAR, kVAR, MVAR)
Apparent Power	Per Phase VA & Total VA (VA, kVA & MVA)
Active Energy	Per Phase & Total Active Energy for Import & Export.(separate) (Wh, kWh , MWh & GWh)
Reactive Energy	Per Phase & Total Reactive Energy
	For lagging & leading. (separate)
	(VARh, kVARh, MVARh & GVARh)
Apparent Energy	Per Phase & Total Apparent Energy
	(VAh, kVAh , MVAh & GVAh)
Auxiliary Power	No External power is required. (Draws power from the voltage signal inputs)
System	Single Phase
	3 phase 3 wire unbalanced load
	3 phase 4 wire unbalanced load
Accuracy	
Volt	1% rdg ± 1 dgts.
Current	1% rdg ± 2 dgts.
Frequency	0.1Hz ± 1 dgts.
Power Factor	1% rdg ± 2 dgts.(For 0.5 Lag - 1.0 - 0.8 Lead)
Active Power	1% rdg ± 2 dgts.
Reactive Power	2% rdg ± 2 dgts.
Apparent Power	1% rdg ± 2 dgts.
Active Energy	Class 1.0 (IS 13779/IEC 1036)
Reactive Energy	Class 2.0 (IEC 1268)
Apparent Energy	Class 1.0

TECHNICAL SPECIFICATIONS	2130
Output Relay	Watt/VAR/VA-SPNO
AC rating	250V, 2A
DC rating	± 30V, 2A
Pulse output	
AC rating	200V, 100mA, Resistive
DC rating	± 200V, 100mA,Resistive
Pulse Rate	Programmable from 1 to 9999 pulse per KWH[I]/KWH[E]/KVARLH/ KVARCH/ KVAH of total
Pulse duration	80 mS ± 10%
Communication Output	
Serial port.	RS485 Multidrop
Baud rate	Selectable. 4800/9600/19200
Start bit	1
Stop bit	1
Protocol	MODBUS - RTU
Isolation	2KV
Environmental	
Working temp.	0 to 55 °C.
Storage temp.	-10 to 70 °C.
Temperature Coeff.	IS-13779
Relative humidity	30 - 95% non-condensive
Warm up time	5 min
Enclosure	
Mounting	Panel/ DIN rail (DIN rail version is without display)
Enclosure	96 x 96 x 74.4 mm
Material	ABS
Terminals	Barrier(Feed through) type Screw Terminals
Accessory	2 Panel mount clamps
Weight	500 gms
Isolation	All Inputs and Outputs are galvanically isolated to 2000 Volts AC.
Burden	5 VA
Sensing Method	True RMS
	Sampling at 320k sample per second on all channel measurement reading simultaneously.
Update Rate	320ms

ORDERING CODE

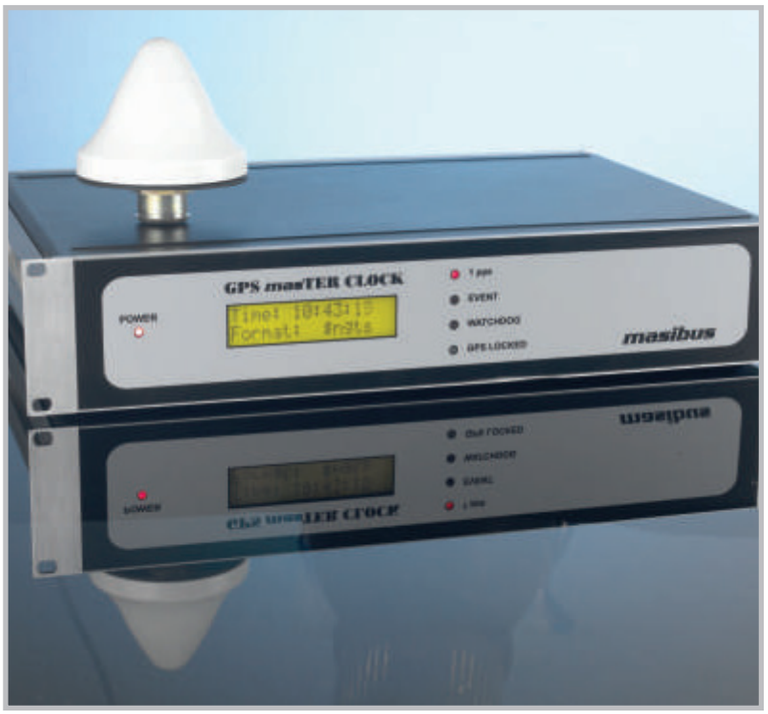
Model 2130

CT Ratio		PT Ratio		Auxiliary Output		
X		X		X	X	X
1	1A	1	63.5/110V - 3Ø 4W	Pulse	Relay	RS 485
2	5A	2	69.3/120V - 3Ø 4W	N	N	N
		3	120/208V - 3Ø 4W	N	N	Y
		4	220/380V - 3Ø 4W	N	Y	N
		5	230/400V - 3Ø 4W	N	Y	Y
		6	240/415V - 3Ø 4W	Y	N	N
		7	275/476V - 3Ø 4W	Y	N	Y
		A	110V - 3Ø 3W	Y	Y	N
		B	120V - 3Ø 3W	Y	Y	Y
		C	380V - 3Ø 3W			
		D	400V - 3Ø 3W			
		E	415V - 3Ø 3W			
		F	440V - 3Ø 3W			
		G	476V - 3Ø 3W			

X - Specify from table

Doc.ref.CB-2/2130/R1/0110

GPS Master Clock (Model MC-1)



Masibus' GPS Master Clock Model MC-I has been developed to address key power and process industry time synchronisation requirements. Whether it's the monitoring, control or analysis of the power system, the GPS Master Clock model MC-I is the most featured and cost-effective GPS time synchronization solution.

MC-I generates a wide range of timing signals via six programmable different output ports. The MC-I has standard output of two serial ports, one PPS Port and four relay outputs. Fixed serial port provides NMEA format data and second serial port is configurable for either NGTS or T-format. IRIG-B-002, IRIG-B-112 & BCD are optional outputs. MC-I unit feature a front panel display, providing both installation and user teams a visual feedback about the time and position. LED indicators provide “at a glance” status information. MC-I synchronizes a wide variety of microprocessor-based power system equipment including: SCADA systems, RTUs, protection relays, sequence of event recorders, digital fault recorders, tariff meters, Slave Display Units, Data Loggers and other Intelligent Electronic Devices (IEDs).

MC-I is having a duo processor design that uses a DSP for IRIG-B signal generation. It can provide facility to program the parameters by local PC connection via serial port. Time zone correction, hour setting, serial data format selection are password protected configurations to avoid unauthorized access.

MC-I occupies the size of 19” x 12” x 3.5”. It is supplied complete with all hardware and software required for the installation, including the antenna, antenna mounting kit, 10 meters antenna cable, 3 meters RS-232 cable and 10 meters RG58 co-axial cable. BNC connector links the antenna to co-axial cable. MC-I provides time synchronisation accuracy better than 1 microsecond between distant locations.

Features

- *Reliable GPS receiver with 12 parallel channel tracking*
- *Multiple time code output formats*
- *Front panel display of local time & position*
- *Electrically Isolated Outputs & Inputs*
- *Multiple format RS232 serial communication*
- *Broadcast function*
- *Password protected configuration*
- *No data loss even if GPS is not locked*
- *Output distribution unit available*
- *Supports protocol NTP for time synchronization*

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GPS Master Clock (Model MC-1)

TECHNICAL SPECIFICATIONS		MC-I
Input		
	Timing accuracy UTC/ USNO	<500 ns with Selective.
	Selective Availability (SA) and tracking	12 satellites
	Positioning Accuracy	<25m SEP without SA.
	Receiver input	1575.42 MHz L1 C/A code
	Tracking	12 parallel channels
	Acquisition time	
	Warm start	Typically less than 30s
	Cold start	Typically less than 2 minute
Interface		
	Display	99 X 24 mm, 2 x 16 Character Display LCD with backlit.
	Displayed Data	Local/ UTC time and date.
		Day of the year, days of the week.
	Position	latitude, longitude.
	Status of the GPS receiver	Available
	Current data Format	COM2
Status LEDs	Power	
	1PPS	
	Watchdog	
	Event	
	GPS Receiver Status	
Outputs		
	1 PPS	One pulse per second, accuracy ±1μs with GPS Locked at 12 satellites available.
	I/O isolation	500V DC
	Connection	BNC Female Connector
	Maximum Distance	50 m
	Event	One event (default one pulse per minute)
	Serial	Two isolated RS232 ports
		COM2 is programmable baud rate, stop and parity bits and message format.
	Serial connection	DB-9 Female connectors
	Maximum Distance	15 m
	LAN	1XLAN interface with RJ-45 connector. Link activity and 10/T Mbit LED.
		Protocol : NTP (For time synchronization)
COM 1		NMEA (GPRMC) Protocol 4800-8-N-1 Frame UTC Time when GPS locked
COM 2		Selectable in between T-Format & NGTS. Programmable COM Port parameters Baud Rate: 4800, 9600 Parity: None, Even, Stop Bit: 1, 2
		Help menu
		Listing of current configuration Set
BCD Parallel Output		DB-37 Female Connector
		Parallel 32 Pin time code with 1ms Resolution.
		The 37 pin port is isolated for 500 VDC from the input.
	Maximum load per bit of BCD	10mA
IRIG–B Output		Serial time code output Modulated & DC level standard

TECHNICAL SPECIFICATIONS		MC-I
IRIG-B Modulated		Carrier 1 KHz
	Modulation Ratio	3: 1
		0 – 10V (p-p) unloaded
		0 – 3V (p-p) 50? load
	Maximum Distance	3 Km
IRIG-B DC Level Shift		0 and 5.2 Volts at logic 0 and logic 1 respectively.
		Rise Time < 15ns
	Maximum Distance	50 m
Alarms	All isolated dry contacts to 230 VAC, 10A maximum	
	1. GPS Sync lost.	
	2. Watchdog.	
	3. Power Fail.	
Power supply	Voltage Range	AC: 85 to 260 V, 47-440 Hz, 1f
		DC: 110-370 V
	Power Consumption	<15W
	The power supply of GPS Master Clock complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B	
Physical Dimension		2U Rack Mount
	Weight	4 Kg
Environment		
	Operating temperature	0° C to +50° C
	Storage temperature	-40° C to +85° C
	Humidity	90% at +40° C (non-condensing)
Programming	Parameters programmable by local PC connection via serial port (COM 2):	
	Time zone correction (UTC OR IST).	
	Hour setting for Display (12 OR 24 Hrs).	
	COM2 serial port setting.	
	COM2 data format selection (NGTS or T-FORMAT)	
	Programmable repetitive event generation output via dry contact (Per Minute or Hour).	
	The configuration mode is Password protected.	
Client Software	An NTP client is required for client side synchronization with any network time server, Masibus' master Time NTP client for Windows R (write here R ina circle) 95/98/NT/2000/XP. Comprehansive time client, server & management software for easy distribution, management and monitoring of time across the network is also available.	

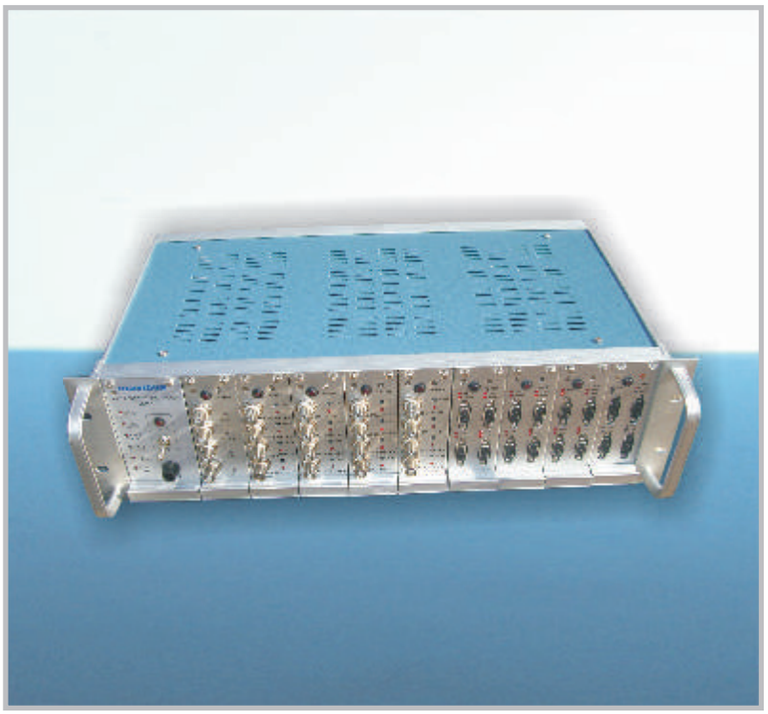
ORDERING CODE

Model	Event		Alarm		IRIG-B		BCD		NTP	
MC-I	X		X		X		X		X	
	N	None	N	None	N	None	N	None	N	None
	1	Event	1	3 Dry contact	1	TTL	1	BCD	1	NTP
					2	Modulated			2	SNTP

X - Specify from table

Doc.ref.CB-2/MC-1/R2/0110

Time Distribution Rack (Model TDR-4)



The Masibus Time Distribution Rack amplifies & distribute different outputs as connected to it rear side.TDR – 4 is housed in a compact 19 '', 3U rack mounted package. It has nine output card slots and one supply card slot. Time Distribution rack- 4 (TDR-4) is an analog system that accepts signals like 1PPS, IRIG-B TTL, IRIG-B modulated and RS232 from GPS and gives four number of isolated outputs of each signal same as input. High Intensity LEDs are located on the front face to show the equipment status.

There are five different types of output cards 1PPS, IRIGB TTL, RS232, EVENT and IRIGB Modulation. Any card can easily be inserted in any slot. If user requires more than four outputs of any signal, user has to insert two or more respected output cards in card slots as per the requirement.

TDR - 4 has also facility to interface redundant GPS incase of any failure occur with the first GPS.The Masibus GPS signal distributor amplifies & distribute different outputs as connected to it rear side.

A common Power ON LED for power supply on. A common ALARM LED for alarm detection of source signal & source instruments. The equipment detects the pulse presence on each output. All the input on the rear face & all the output signals are located on the front of the equipment.

Features

- *Accept signals like 1PPS,IRIG-B TTL,IRIG-B Mod,RS 232 from GPS*
- *Five Different types of output cards in single rack.*
- *Total 36 outputs available from single rack*
- *Any card can be inserted in any slot*
- *High intensity LEDs on the front for equipment status*
- *Hot Swappable*

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Time Distribution Rack (Model TDR-4)

Common Features

The masibus Time Distribution Rack amplifies & distribute different outputs as connected to it rear side.

- The equipment is housed in a compact 19", 3U, 260mm rack mounted package.
- Hight intensity LEDs are located on the from face to show the equipment status.
- A Common Power ON LED for power supply on.
- A Common ALARM LED fro alarm detection of Source signal and source instruments.
- The equipment detects the pulse presence on each output.
- All the input on the rear face and all the output signals are located on the front of the equipment.
- Hot Swappable
- Consumption : 35 W [when fully loaded]
- The equipment take power from the main (230 V AC) by Allied standard connector with fuse, filter and On/Off switch. Instrument is also faciliated with the provision of direct 24V DC supply.

Individual Specification

Power Supply Card

- Input range 85 - 264 VAC (wide range) 120 - 300VDC
- Frequency 47-440 Hz
- Inrush current <18A peak @ 115VAC, <36 A peak @230 VAC, cold start @ 25°C
- Input current 1.5A max. (RMS) @ 115 VAC
- Efficiency 70% typical at full load
- Safety ground leakage current <0.5mA @ 50/60 Hz; 264VAC input
- Compliance : FCC Class-B, CISPR22 Class-B, EN55022 Class-B, VDE0878PT3 Class-B

1PPS / IRIG B TTL Card

- 5V TTL input level on BNC, 50Ω , connector.
- 4 nos. of 5V TTL outputs level on BNC, 50Ω, connector.
- 4TT outputs level on BNC + status indication
- The input pulse is distributed without any change in polarity or duration
- Maximum Distance : 10 meters
- Isolation of 2000 MΩ at 1500 VDC from all other ports, input and output and power supply.

IRIG B Modulation Card

- Time Code Amplifier and distributor provide analog IRIG B or any other format, Time code amplification and distribution. The time codes are based on a 1 kHz amplitude modulated (1/3) sine wave carrier.
- In input the equipment receives an analog signal from an external IRIG B source.
- When detecting an input signal, the LED SIGNAL turns on. The amplified signal is distributed over the 4 outputs of the equipment.
- Each of the four outputs could be adjusted. These settings are: the gain of each output amplifier.
- The gain of each amplifier is adjusted by a dedicated potentiometer accessible from front.
- The output level is independently settled for each type of output.
- The analog time code signal connector is a base isolated female BNC
- 1 KHz AM Signal
- 3:1 Modulation Ratio
- 150Ω Output Impedance
- Isolation of 2000 MΩ at 1500 VDC from all other ports, input and output and power supply.

RS232 Card

- The Time frame distributor allows ASCII frame distribution on
- 4 serial tracks in compliance with RS232 standard
- A front face On LED show that power supply is on
- The output data are diffused with the same characteristics of the available input data
- Transfer speed, parity or number of data bits, couldn't be changed
- 1 input to 4 outputs mode
- The input connectors are Sub'D 9 pins female and outputs are male type
- Isolation of 2000 MΩ at 1500 VDC from all other ports, input nd output and power supply.
- DB9 Female Connectors
- Maximum Distance of 50'

EVENT Card

- 1 input 4 outputs
- Four potential free relay outputs are available on the front fascia of the card
- 4 LEDs are available which shows the status of each event.
- One power LED shows status of the power of the card
- Inverted event logic output (refer jumper setting)
- 350 VAC, 120mA maximum
- Isolation of 2000 MΩ at 500 VDC from all other ports input and output and power supply

ORDERING CODE

Model TDR-4

Card Slot	1	2	3	4	5	6	7	8	9
	X	X	X	X	X	X	X	X	X

Select ordering code for each card slot	
N	None
1	IRIG-B Modulated
2	IRIG-B TTL
3	1 PPS
4	RS 232
5	1 PPM/ Event

Eg: If you require 12 nos. IRIG-B modulated & 12 nos. RS 232 nos. output then TDR 4- 111444NNN will be the ordering code.

Doc.ref.CB-2/TDR-4/R1/0110

Time Display Unit (Model TDU-64)

Masibus time display unit Model TDU-64 is a versatile, multi-featured time code driven clock display. This unit decodes and displays all versions of serial communication based formats, IRIG-B modulated and TTL time codes. Serial communication decoding supports NGTS, NMEA and T-Formats. IRIG-B decoding supports the 1 kHz modulated format (B1) and the TTL format (B). IRIG-B date decoding is supported for the IEEE 1344 standard. It retains time during loss of power and absence of time code. Automatic detection of time code type and date encoding is also available.

Model TDU-64 contains features like +12 to -11 hour time zone offset setting, half hour offsets, programmable time and date when time code is absent. The 100mm display can be viewed from a distance of over 40m. This makes TDU-64 ideally suited to many application where one wishes to have sight of the time from long distance.

The rugged aluminum case makes TDU-64 ideal for demanding industrial environments. Flush LED display of TDU-64 offers a wide angle viewing comfort.

Model TDU-64 can alternatively be used as large process display that accepts inputs either in TTY current loop, BCD format or serial port devices like PLC/ RTU/ IEDs. This extends its application for factory and process automation requirements.

Features

- *6 digit time display unit*
- *100mm digit height*
- *Rack/Wall/Panel/ Free stand mounting options*
- *Real time clock in minutes, hours & seconds*
- *NGTS/NMEA/T-format/IRIG-B input interface*
- *+12 to -11 hour time zone of set*
- *Retains time during loss of power/time code*
- *Large display for easy viewing from a distance*

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Time Display Unit (Model TDU-64)

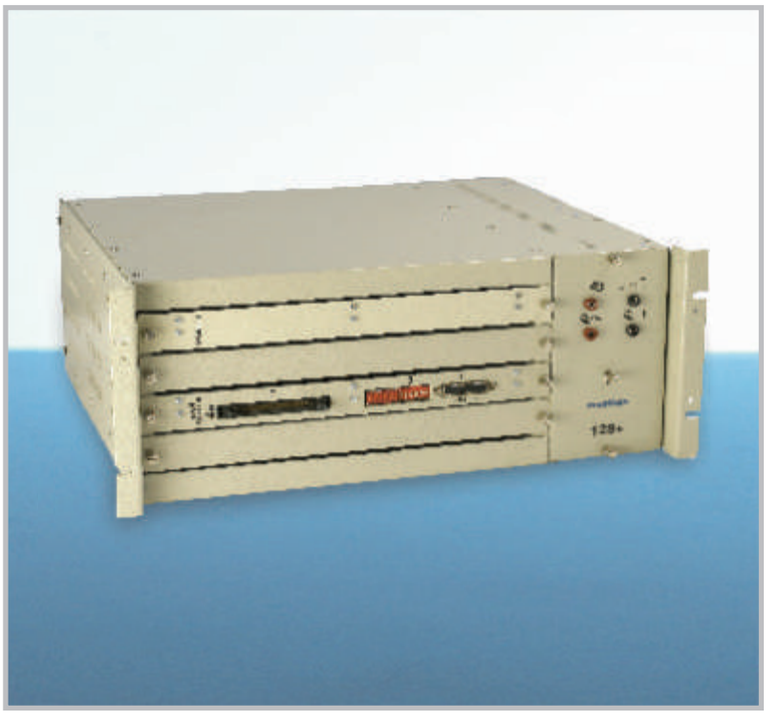
TECHNICAL SPECIFICATIONS	TDU-64
Input	
Serial Communication	
RS-232	25 to 50 Foot at 9600 fixed Baud-rate
RS-485	1.2 Km
TTY current loop	2000 Feet
Format supported	NGTS, NMEA, T-Format
Connector	DB9 female
IRIG-B modulated	
Level	Approx. –1 to 3V Pk-Pk (0db/50?)
Connector	BNC female
IRIG (B) TTL	
Level	Approx. 0 to 5.2V, Rise Time < 25nSec (0db/600?)
Connector	BNC female
Power Requirements	
AC Input Voltage	100 – 240 VAC
AC Input Frequency	47 400 Hz Or DC
AC Input Connector	Phoenix MSTB 2.5 Male Female MVSTB Detachable can accept up to 2.5 Square mm wire
Power supply compliance	B, VCCI-B. s FCC-B, CISPR22-B, EN55022-B, VCCI-B
Power Consumption	10 Watts
Physical	
Circuit boards	Copper coated laminate FR-4 Grade epoxy Glass
Case	APW 42 Series
Chassis Size	7.5" X 25" X 3.5" (H X W X D)
Mounting	Rack/ Wall / Panel/ Free Standing
LED Characters	4" (100 mm)
Operating/ Storage Temperature & Humidity	
Operating temperature	0 to 55 °C
Operating humidity	Up to 90% RH (non condensing)
Storage temperature	-40 to 70° C
Storage humidity	Up to 90% RH (non condensing)

ORDERING CODE

TDU-64 - Time Display Unit

Doc.ref.CB-2/TDU-64/R0/0110

Sequential Event Recorder (Model SER 128+)



The Model SER 128+ is a complete Masibus event recording system for small-scale monitoring applications. Its extensive communication facilities make it especially valuable as front end instrumentation for offloading to higher level hosts via modem devices. At the same time, the Model SER 128+ serves as a local indication and recording source for ongoing events data.

The system is designed in building block fashion for configuring the required capacity with room for future expansion. Its capacity ranges in 64 point increments from a minimum of 64 point increments from a minimum of 64 points (one scanner card) upto a maximum of 128 points for a single cage system.

The Masibus Model SER 128+'s sequential memory is capable of queing over 220 event message per 64 points on each scanner card. The distribution of memory on separate scanner cards in 64 point increments ensures that the failure of individual cards will not destroy the system's entire memory bank. In addition, the Model SER 128+ features event storage for analysis purposes in the form of a circular historical buffer, whose design is unique in events recording instrumentation. It stores the last 2000 event captured, which can be easily accesed for pre-and post-fault analysis. By using a keyboard entry, a list of all events in the buffr of events occuring since the last request can be requested, which is particularly useful in unmanned applications.

In all, there are six different RS232C ASCII output ports available on the Model SER 128+, with a seventh port configured to accept an IRIG-B clock synchronization input.

Inherent reliability and security ensure the integrity of events data.

A crystal controlled clock that can be synchronized to the AC line, hourly input line, IRIG-B, or satellite receiver. There is battery back-up for both date and time and historical buffer. Fanally, a programmable security code is available to limit access to the system.

Features

- *Maximum up to 128 point capability in increment of 64 (2 scanner card)*
- *1 millisecond resolution.*
- *10 microseconds scan time.*
- *Sequential memory of 220+ event messages per 64 point scanner card.*
- *Six RS-232 port*
- *IRIG-B for time synchronization.*
- *Windows based RCW software for analysis.*

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Sequential Event Recorder (Model SER 128+)

128+

Maximum Pint Capability

Single cage, 128 points total in increments of 64 (two 64-point cards)

Physical Data

Dimension : 19.00" (482.6 mm) rack mount,
7.0" (177.8 mm) H x 16.50" (419.1mm) D

Sequential Memory Capability

220+ event messages per 64 points

Historical Memory Capability

Circular buffer with 2000 event storage

Communication Ports (RS232 ASCII)

3 standard; 3 optional

Auxiliary Relay Outputs

8 available rated at ½ amp at 120 Vac or 2 amp at 30 Vdc

Input Power

85-264 VAC/120-370 VDC

Field Contact Voltage

24V DC, 48V DC internally or externally supplied,
125VDC or 250VDC external only

Scan Time

10 microseconds or less

Resolution

1 millisecond

Internal Clock Accuracy

25 parts per million (ppm), standards.

BClock Synchronization

a. 50/60 Hz
b. External sync pulse, once per hour
c. GOES satellite, RS232C input from a True Time model 468DC clock
d. IRIG "B"

Input Isolation

Protected to 5000 V with a 1.5 mHz wave to 50 microseconds;
IEEE587-1980 Test

Software Adjustable Parameters Keyboard Initiated

a. N.O./N.C. field contacts
b. Alarm input time delay
c. Return-to-normal time delay
d. Point enable/disable
e. 60 character legends with editing capability
f. RS232C output port, fully configurable for device type, baud rate, and parity
g. Pint assignments to each RS232C port
h. Eight configurable relay outputs
i. Time set or correction and date input
j. Define oscillatory conditions

Reports Available, Operator Initiated

a. Point configuration report
b. System configuration report
c. Output port assignment report
d. Full historical buffer report
e. Historical buffer update report
f. Point dalete report
g. Alarm summary report
h. Functional test report
i. List legend report

Environmental data

a. 0-95% humidity (non-condensing)
b. 0 to 50°C temperature
c. Meets current standards for RFI/EMI

RS232 Equipment Compatibility

a. Color CRT display
b. Printer terminals
c. Printer
d. Cassette storage recorders
e. Various modems (long haul/short haul) for telephone, radio or microwave
f. Computers via modems or RS232 link
g. Serial input windows annunciators
h. Distributed process control systems
i. Programmable controllers
j. GOES satellite receivers (time sync)

Options

a. Satellite clock synchronization
b. IRIG B clock synchronization
c. Remote configuration workstation
d. Return-to-normal legends, 60 characters
e. Redundant Power Supply Chassis

Remote Configuration Workstation Software

- Windows based
- Configuration databased can be generated off-line
- Hard disk database storage
- Load database into equipment
- Retrieve database from equipment
- View, edit, and print configuration databases
- Automatic or manual historical event archiving at user defined interval
- View and print historical events
- Plant/Area wise grouping of points up to 8 groups
- Easy to use menu-driven operation
- Full-Screen interactive editing of databases
- Password protected

Doc.ref.CB-2/SER 128+/R0/0110

Vibration Switch (Model VSW 150)

Vibration Switch provides essential protection for critical fans, pumps, motors and other industrial machines. It measures the vibration to which it is exposed and generates relay output when vibration exceeds the preset threshold values.

The Vibration Switch is well equipped for rotating machine protection applications. It offers bright 3½ digit display, precise 4-20mA analog output and one relay out put with status indicator resulting in three-in-one product. Set point setting for relay output is user configurable. Remote sensor mounting gives better performance and higher temperature compliance.

Reliability is ensured by our ISO 9001 approved quality control system from UL labs. Masibus is quality manufacturer of vibration switch having various features and ranges.

Vibration Switch is a strategic tool for protection of machines which measures online vibration and provides relay output for operator alarm or machine trip purpose. Vibration is displayed and alarm is generated when vibration is abnormal. Once alarm is generated, machine data can be analyzed for the root cause of increased vibration. This provides an opportunity for early fault detection.

Vibration is monitored in terms of r.m.s. and peak. When overall vibration is to be measured, r.m.s. and peak measurement technique is considered best for general machine health.

Vibration Switch makes online vibration monitoring cost-effective with its optional retransmission analog output which can be connected to plant RTU / PLC / DCS systems.

Masibus has a proven track record of manufacturing online process monitoring instruments for over 3 decades.

Features

- *3 in 1 Vibration Transmitter - Display - Switch*
- *Bright 3½ - digit LED display*
- *Vibration range available upto 50mm/S*
- *Relay & analog output*
- *Excellent long-term stability*
- *Easy configuration from front keys*
- *Set value switch*
- *Local/ Remote mounting provision for high temperature application*

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Vibration Switch (Model VSW 150)

HARDWARE SPECIFICATIONS	VSW 150
Mounting	Remote sensor mounting Vibration sensor is mounted on bearing (surface where vibration measurement is required) and connected to Vibration switch. Switch takes analog signal proportional to 0-25mm/S from vibration sensor.
Sensor Mounting	Stud / Pad mounting
Electrical Connection	Screw type for power and relay output connection that can accept up to 2.5mm^2 wire.
Vibration Range	upto 50mm/S
Display	Display type: 3½ digit seven segment LED (Height of LED: 7.62mm) Display Resolution: 0.01% F.S. Display Unit: mm/S
Turn ON time	120 sec
Power Source	90 to 270 V AC / 120 to 385 V DC
Power Consumption	Less than 7 VA
Comparator Output	Relay Output: 230 VAC, 2 A Hysteresis: Settable via trim port upto 1.0mm/s Relay can be set to NO or NC. (Factory Set, Default Setting- NC)
Retransmission Output	4 - 20mA DC
Accuracy	± 5% of Full span
Load	Max. 450Ω
Frequence range	10 Hz to 1 KHz
Indications	
Power On	Red Led
Relay On	Green Led
Insulation Resistance	Greater than 50MΩ
Insulation to Withstand Voltage	1000VAC for one minute, between supply to internal circuits.
Zero & Span	Trim pot variation ±5% accessible on the Front of the module.
Ambient Temperature	0 to 50°C
Storage Temperature	0 to 80°C
Operating Humidity Range	20 to 95% RH non-condensing
Case Material	ABS plastic enclosure
Construction & Size	80mm x 82mm x 85mm
Sensor Operating Temperature	- 50 to 121 °C
Sensor Type	PZT ceramic
Weight	<400 grams approx.

ORDERING CODE

Model	Vibration range			AO		Mounting
VSW 150	XX		Unit	X		X
	1R	0-12.5	m	N	None	S Stud
	2R	0-25	g	1	4-20mA	P Pad
	3R	0-50				
	1P	0-12.5				
	2P	0-25				
	3P	0-50				

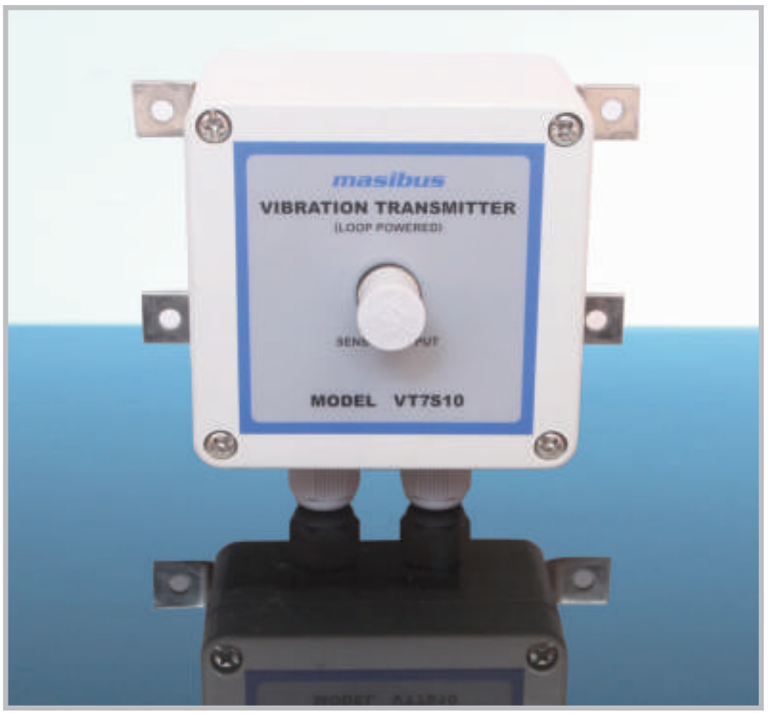
R - RMS measurement m - mm/S

P - Peak measurement g - 9.81 m/S^2

X - Specify from table

Doc.ref.CB-2/VSW-150/R2/0110

Vibration Transmitter (Model VT7S10)



Masibus' Model VT7S10 Vibration Transmitter is an innovative product that excites and reads signal from high temperature accelerometer and transmits overall vibration value with 4-20mA on loop power. It provides output for essential continuous monitoring of critical fan, pump, motor and other industrial machines. It measures the vibration to which it is exposed.

Masibus has a proven track record of manufacturing online process monitoring instruments for over 3 decades. Vibration transmitter makes online vibration monitoring system cost-effective with its analog output which can be connected to plants instrumentation and control systems like RTU / PLC / DCS.

Vibration Transmitter is a strategic tool for predictive maintenance. It measures online vibration and provides easy communication to data acquisition system where vibration can be displayed, trended and alarm can be generated. On this basis further analysis can be done using on board buffered output (dynamic signal) connected to vibration analyzer for diagnosing the machine's problem.

Vibration is measured in terms of r.m.s. and peak. When overall vibration is to be measured, r.m.s. and peak measurement technique is considered best for general machine health.

Requirement for high temperature sensor with 4-20mA output and a dynamic signal are a primary requirement for machine protection in the industry today. Most of the products available do not have all three functions at an affordable cost. Masibus has conceived VT7S10 to meet requirement for such applications.

Features

- *Loop power vibration transmitter (4-20 mA output)*
- *Measurement of overall vibration level in rotating machines.*
- *Dynamic buffered signal output for analysis*
- *Velocity range 0-12.5, 25, 50mm/S*
- *Reading type : Peak to Peak and RMS value*
- *Frequency range : 10 Hz to 1 KHz*
- *Excitation Voltage 19-30 VDC*
- *Sensor temperature upto 150 ºC*

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Vibration Transmitter (Model VT7S10)

HARDWARE SPECIFICATIONS	VT7S10
Mounting	Remote sensor mounting Vibration sensor is mounted on bearing (surface where vibration measurement is required) and connected to Vibration transmitter. Transmitter takes analog signal proportional to 0-25mm/S from vibration sensor. Transmitter is wall mounting type.
Sensor Mounting	Stud / Pad mounting
Electrical Connection	Screw type for excitation voltage and analog output connection that can accept up to 2.5mm^{2}wire.
Cable Gland	PG 7
Vibration Range / Mode	mm/S: 0 to 12.5, 25, 50mm/S (factory set) g: 0 to 2,5,10,15g (factory set)
Excitation Voltage	19 to 30 VDC
Accuracy	+ or - 2%* of full span
Output	4 - 20mA DC
Signal Transmission	Two wire system
Load	Max. 600O at 30 VDC
Frequence range	10 Hz to 1 KHz
Dynamic signal	1Hz to 10 KHz (BNC connector)
Operating Temperature	0 to 55°C
Operating Humidity Range	30 to 95% RH (non-condensing)
Case Material	ABS plastic enclosure
Size	80 mm (H) x 82 mm (W) x 55 mm (D)
Sensor Operating Temperature	- 50 to 120 °C (up to 150 °C option)
Sensor Type	PZT ceramic
Sensor Output	100mV/g
Weight	250 gms Approx.

Cables

Vibration sensor cables plays an important role in online vibration monitoring and protection system. Cables with suitable connector makes installation easy and reliable. Industrial environment can be different for different plants and reliable cables are an important element to achieve best performance from machine protection system.

Masibus offers various kind of cables as per customers requirement. Selection of cable shall be done considering environmental condition.

Cable Connection	Vibration sensor is mounted on bearing and connected to transmitter unit with cable
Type of Cables	
Standard Cable	Applicable for ambient temperature with external conduit
Teflon Cable	Applicable for temperature upto 150 °C with external conduit
Armored Cable	Applicable for temperature upto 150 °C with flexible steel armor protection (no external conduit required)

* Accuracy is 5% at input signal frequency greater than 800Hz and frequency less than 20 Hz.

ORDERING CODE VT7S10

Model	Vibration Range			Measurement		Sensor Mounting
VT7S10	**XX**		**Unit**	**XX**		**X**
	1V	0-12.5	mm/sec	0R	RMS	S Stud Mounting
	2V	0-25	mm/sec	0P	Peak	P Pad
	3V	0-50	mm/sec	PP	Peak to Peak	
	1A	0-2	g			
	2A	0-5	g			
	3A	0-10	g			
	4A	0-15	g			

ORDERING CODE CABLES

Model	Con. Type	Cable type	Protection	Length in mtr.	Molding
CBL	X	X	X	XX	X
	S Straight	S Standard	U Unarmored	03	Y Yes
	R Right angle	T Teflon	A Armored	05	N No
				10	
				20	
				30	

Doc.ref.CB-2/VT7S10/R2/0110

Dual Channel Vibration Transmitter (Model VT7S12)

VT7S12 is Micro controller based Dual Channel Vibration Transmitter. Masibus' Model VT7S12 Vibration Transmitter is an innovative product that excites and reads signal from high temperature accelerometer and transmits overall vibration value with 4-20mA. It measures Vibration in different parameters like Acceleration, Velocity, Displacement. Measuring range is field configurable. VT7S12 is a low cost high performance two channel vibration alarm monitor in a modular format ideally suited for protection of all of your rotating machinery against costly breakdown, including turbines, motors, fans, pumps etc.

Vibration is measured in terms of r.m.s. and peak. When overall vibration is to be measured, r.m.s. and peak measurement technique is considered best for general machine health.

Vibration transmitter makes online vibration monitoring system cost-effective with its analog output which can be connected to plants instrumentation and control systems like RTU / PLC / DCS.

With its compact size and convenient DIN rail mounting, it can be fitted to the machine or remotely in equipment panels.

Machine protection is provided with VT7S12's dual adjustable alarm to automatically trip plant, or via analogue outputs applied to SCADA, DCS or other monitoring/control systems.

Features

- *Small Compact size DIN rail mounted*
- *Digital Display*
- *Micro controller based dual channel Transmitter*
- *Transducer/cable health check*
- *Easy configuration front keys*
- *Dual Retransmission 4-20 mA output*
- *Measuring parameter: Acceleration, velocity, displacement - field configurable*
- *Relay for Alarms, Danger*

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Dual Channel Vibration Transmitter (Model VT7S12)

HARDWARE SPECIFICATIONS	VT7S12
No of Input	Two/One
Input type	Accelerometer
Mounting	Remote sensor mounting Vibration sensor is mounted on bearing (surface where vibration measurement is required) and connected to Vibration transmitter. Transmitter takes analog signal proportional to vibration range from vibration sensor. Transmitter is DIN rail.
Sensor Mounting	Stud / Pad mounting
Electrical Connection	Screw type for excitation voltage and analog output connection that can accept up to 2.5mm2 wire.
Display	4 digit, 0.3" seven segment red LED
Keys	3 keys (ENT, SEL, ESC)
Relays	Three - Alarm, Danger, Health
Calibration	Through Front Panel
I/P to Display Accuracy	± 2.0% *of full scale
Vibration Range / Mode	Acceleration: 0 to 50 g Velocity: 0 to 50.0 mm/sec Displacement: 0 to 1000um (Field configurable)
Output	4 - 20mA
Signal Transmission	Four wire system
No of Output	Two (O/P-2 is optional)
Load	750 Ohms max (for current o/p) 4000 Ohms min (for voltage o/p)
Frequency range	10Hz to 1KHz
Output Accuracy	+/- 0.25% of Full Scale
Operating Supply	18 to 30 VDC
Power Consumption	<10VA
Operating Temperature	0 to 55°C
Operating Humidity Range	40 to 95% RH (non-condensing)
Case Material	ABS plastic enclosure
Dimension	70(W) x 75(H) x 110(D) mm
Sensor Operating Temperature	- 50 to 121 °C (up to 150 °C option)
Sensor Type	PZT ceramic
Sensor Output	100mV/g

Cables

Vibration sensor cables plays an important role in online vibration monitoring and protection system. Cables with suitable connector makes installation easy and reliable. Industrial environment can be different for different plants and reliable cables are an important element to achieve best performance from machine protection system.

Masibus offers various kind of cables as per customers requirement. Selection of cable shall be done considering environmental condition.

Cable Connection	Vibration sensor is mounted on bearing and connected to transmitter unit with cable
Type of Cables	
Standard Cable	Applicable for ambient temperature with external conduit
Teflon Cable	Applicable for temperature upto 150 °C with external conduit
Armored Cable	Applicable for temperature upto 150 °C with flexible steel armor protection (no external conduit required)

ORDERING CODE VT7S12

Model	No of Channel		Measurement		Sensor Mounting	
VT7S12	X		XX		X	
	1	Single	0R	RMS	S	Stud Mounting
	2	Dual	0P	Peak	P	Pad
			PP	Peak to Peak		

ORDERING CODE CABLES

Model	Con. Type		Cable type		Protection		Length in mtr.	Molding	
CBL	X		X		X		XX	X	
	S	Straight	S	Standard	U	Unarmored	03	Y	Yes
	R	Right angle	T	Teflon	A	Armored	05	N	No
							10		
							20		
							30		

* Accuracy is 5% at input frequency greater than 800 Hz & frequency less than 20 Hz.

DOC.ref.CB-2/VT7S12/R0/0110

Vibration Monitoring System - 4 Channel (VMS-4S)

VMS-Four channels system is good to monitor few equipment in section. It gives overall vibration values and alarm in case of abnormal vibration with vision to provide cost effective and performance oriented solution.

Masibus is supplier of quality vibration monitoring system. VMS-4S is available with four channels. Various features and ranges are available to select right type of monitoring.

VMS-4S is important tool for plan wide predictive maintenance. It takes up online vibration and provides data though software. Vibration is displayed and alarm can be generated. Once alarm is generated further analysis can be done using buffered output. It provides opportunity to pin point the problem.

Masibus VM-4S, consist of vibration sensor as input and provide 4-20mA output. It continuously monitors the vibration of all the equipments. Data is offered in terms of r.m.s. R.M.S. detection is best for general machine health monitoring, when overall vibration is measured.

Masibus products are convenient to use and easy to install in industrial environments with proven track record of more than 30 years.

Features

- *Online Vibration monitoring*
- *Micro controller based*
- *230V AC power supply*
- *4 channels monitoring*
- *RS-485/ 232 Output for communication (Modbus)*
- *Buffer Output*
- *Parameter: Displacement, Velocity, Acceleration*

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Vibration Monitoring System - 4 Channel (VMS-4S)

HARDWARE SPECIFICATIONS

Mounting

Vibration sensor is mounted on bearing (surface where vibration is required) and connected to VMS-4S. Output of VMS-4S communicates with software on RS-485. In case of more than one machine RS-485 loop can be done.

VMS-4S

No. of channels	4
Input type	Accelerometer 100mV/g Velocity Sensor 100mV/in/sec
Display	2 digit 0.56" Red LED for channel 4 digit 0.56" Red LED for data

Various range

Velocity	0-25 mm/sec, 0-50 mm/sec (factory selectable)
Displacement	0 - 100 microns 0 - 500 microns 0 - 1000 microns (factory selectable)
Acceleration	0- 2g 0 - 5g 0 -10g
Accuracy	± 5% of span
Physical Case Bezel size Panel cutout	MS powder coated with ABS molded bezel 96 X 192 mm 92 X 188 mm

HARDWARE SPECIFICATIONS

Retransmission o/p:	4-20 mA DC
Relay o/p:	2A@230 VAC with NO/C/NC
Isolation	250 V for channel to channel 1.5kv for Analog inputs & Communication PORTS
Communication	RS485/232 serial communication
Communication Protocol	MODBUS (RTU-Slave)
Baud rate	9600,14400,19200, 28800,38400
Supply Voltage	90V to 260VAC, 50Hz
Power Consumption	< 20VA

Environmental condition

Operating Temperature range	0 to 55 degree centigrade
Operating Humidity	40 to 95% RH

SELECTION GUIDE VMS-4S

Range CH1	Range CH2	Range CH3	Range CH4	Relay Output	Retransmission	RS-485 Communication
1 = 0-25 mm/sec	1 = 0-25 mm/sec	1 = 0-25 mm/sec	1 = 0-25 mm/sec	Y=Yes	Y=Yes	Y=Yes
2 = 0-50 mm/sec	2 = 0-50 mm/sec	2 = 0-50 mm/sec	2 = 0-50 mm/sec	N=No	N=No	N=No
3 = 0-100 microns	3 = 0-100 microns	3 = 0-100 microns	3 = 0-100 microns			
4 = 0-500 microns	4 = 0-500 microns	4 = 0-500 microns	4 = 0-500 microns			
5 = 0-1000 microns	5 = 0-1000 microns	5 = 0-1000 microns	5 = 0-1000 microns			
6 = 0-2g	6 = 0-2g	6 = 0-2g	6 = 0-2g			
7 = 0-5g	7 = 0-5g	7 = 0-5g	7 = 0-5g			
8 = 0-10g	8 = 0-10g	8 = 0-10g	8 = 0-10g			
9 = Disable	9 = Disable	9 = Disable	9 = Disable			

Example: VMS 4S 1372YNY

ORDERING CODE CABLES

Model	Con. Type	Cable type	Protection	Length in mtr.	Molding
CBL	X	X	X	XX	X
	S Straight	S Standard	U Unarmored	03	Y Yes
	R Right angle	T Teflon	A Armored	05	N No
				10	
				20	
				30	

Doc.ref.CB-2/VMS-4S/R1/0110

Vibration Meter (Model VM908)

Masibus VM908 vibration meter is a basic portable vibration measurement product that reads vibration in various mode. It provides essential periodic monitoring of fan, pump, motor and other industrial machines. It measures the vibration to which it is exposed.

Masibus has a proven track record of manufacturing portable instruments and online process monitoring instruments for over 3 decades. Vibration meter makes cost-effective off line vibration monitoring instrument with various important parameter i.e. displacement , velocity, acceleration.

Vibration meter is a strategic tool for predictive maintenance. It measures off line vibration and provides easy evaluation of health of machines. On this basis further analysis can be done using vibration analyzer for diagnosing the machine problem.

Vibration is measured in terms of r.m.s. and peak. When overall vibration is to be measured, r.m.s. and peak measurement technique is considered best for general machine health.

VM908 is very handy easy to use device for any maintenance crew. It gives very easy understanding of equipment health and guides for repairs. It is also good tool to check out if repair has improved health of machine. Maintenance team can be confident about repair work done by ensuring that vibration reading post repair has gone down and machine is healthy.

Features

- *Backbone of Predictive maintenance*
- *Essentials for Good Maintenance*
- *Necessary Instrument for Tool Box*
- *Basic vibration measurement*
- *Measurement of overall vibration level in rotating machines*
- *Parameter: Displacement, Velocity, Acceleration*
- *Frequency range: 10 Hz to 5 Khz*
- *High Frequency: Acceleration (unit:m/s2): Equivalent peak*
- *Battery: 9V 6F22, 25 hours of continuous operation*

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Vibration Meter (Model VM908)

HARDWARE SPECIFICATIONS	VM908
Portable	Light, fit's easy in pocket
Display	3 1/2 LCD digital display Automatic power off
Sensor Mounting	Magnetic mounting
Sensor Type	Piezoelectric Accelerometer
Vibration Range / Mode	Displacement: 1-1999 micron (peak-peak) Velocity: 0.1-199.9 mm/s true RMS Option peak-peak Acceleration: 0.1-199.9 m/s2 peak Option (peak-peak)
Accuracy	+/- 5% of display +/- 2 digits
Frequency responses	Displacement : 10-1000Hz Velocity : 10-1000Hz Acceleration : 10-5000Hz
Dimensions	13x6x2.3 cm; Weight: 200 g.
Temperature	5 - 50°C
Functions of the (Measure) key:	a). Key press: Power-on and begin measuring b). Key release: Hold the measured value for twenty seconds and then power off automatics

ACCESSORIES	VM908
Accelerometer	1 number
Extension probe	1 number
Sensor cable	2 numbers
Magnetic mount	1 number
Carry bag	1 number

Doc.ref.CB-2/VM 908/R1/0110

RPM MONITOR (Model RPM-5006)

RPM-5006 is designed for speed measurement of industrial equipment using proximity sensor. It provides non-contact measurement of rotor speed. As each tooth passes through proximity sensor, a signal (voltage pulse) is generated. This signal is then sent to the5006-RPM indicator for monitoring. When RPM exceed the switch's set-point, the switch trips, sending an electric signal.

RPM-5006 monitor is versatile microcontroller based RPM indicator. The instrument is 96x96x121mm polyplastic enclosure with standard cutout of 92x92mm. Front is IP54 to withstand dusty environment. The unit has four 0.56" segment LED display for the RPM indication.

Reliability is ensured by our ISO 9001-2000 approved quality control system from UL labs. Masibus is quality manufacturer of RPM monitor having various features and ranges.

RPM-5006 is strategic tool for monitoring protection of machines for over speeding. It measures online RPM and provides relay output for operator alarm or machine trip purpose. Once alarm is generated, machine data can be analyzed for the root cause change in speed. This provides an opportunity for safety of machine. Speed of rotor is monitored in terms of revolution per minute(RPM) .

RPM-5006 makes cost-effective online vibration monitoring with its optional retransmission analog output which can be connected to plant RTU / PLC / DCS systems.

Masibus has a proven track record of manufacturing online process monitoring instruments for over 3 decades.

Features

- *RPM - Display - Switch*
- *4 digit 0.56" seven segment red LED's*
- *Various RPM range available*
- *Relay & analog output*
- *Excellent long- term stability*
- *Easy configuration from front keys*
- *Set value switch*

masibus®
Advanced Automation - Sure Solutions

RPM MONITOR (Model RPM-5006)

HARDWARE SPECIFICATIONS	RPM-5006
Mounting	Remote sensor mounting Provision of drilled and tapped magnetic pick-up mounting holes on housing is used for mounting of pick-up.
Input type	0-83.33 Hz frequency input from proxy sensor
RPM Range	upto 3000 RPM
Temperature Coefficient	Less than 150ppm/°C
Display	Display type: 4 digit 0.56" seven segment red LED's for process variable
Power Source	85-265 VAC@ 50Hz/120-290 VDC
Power Consumption	Less than 10 VA
Relay Output	230 VAC, 2 A
Accuracy	± 0.25% of FS ± 1 count
Retransmission Output	4 - 20mA DC
Load	Max. 450O
Response time	< 3.5 secs
Isolation	1.5k VDC
Insulation Resistance	>200 MΩ@500 VDC
Zero & Span	±10% Variation from keyboard.
Ambient Temperature	0 to 55°C
Storage Temperature	0-80°C
Operating Humidity Range	30 to 95% RH (non-condensing)
Body Construction	Poly carbonate plastic
Construction & Size	CASE: 96x96x121 mm
FRONT BEZEL	96x 96 mm
PANEL CUTOUT	92 x 92 mm
Weight	360 grams

ORDERING CODE

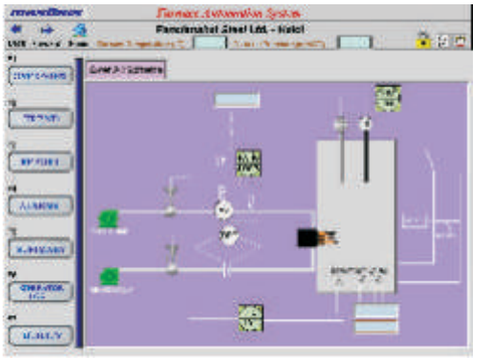
Model	RPM range		AO	
RPM-5006	X		X	X
	1	0-100 RPM	N	None
	2	0-1000 RPM	1	4-20mA
	3	0-3000 RPM		

X - Specify from table

Doc.ref.CB-2/RPM 5006/R2/0110

Furnace Automation System

Objective



Pusher type billet reheat furnace provides large opportunity of saving by implementation of furnace automation system. Generally such furnaces are designed on counter flow principal under which material will be pushed by means of a hydraulically operated pusher mechanism and discharged from the side with the help of electro-mechanical ejector. The furnace can have multiple firing zone, pre-heat and soaking with number of burners on the front and side walls. To control the above system Masibus has developed a unique solution for combustion control using ratio-controller with over riding oxygen control.

Objective of the furnace automation system is :

- To provide automatic temperature control for the billet heating through correct air-fuel ratio for proper combustion.
- Uniform temperature across the job inside the furnace.
- Correct Oxygen Control to avoid surface scaling.
- Proper furnace control response for variations in loading and intermediate stoppages.

Process description:

The furnace can have multiple firing zones with burners located on the front wall as well as on the side walls. The waste gases after preheating the stock will be allowed to escape through the flue ports located near the charge end wall and finally escape through flue tunnel to the chimney.

For automated control an integrated control system is provided to achieve the desired control strategy. Actual programming of the set point and controls are made possible through local keyboard and PC based SCADA system. Ratio controller continuously and automatically controls air and fuel input to each zone of the burner. To provide optimum corrections in the set ratio, over-riding control is implemented using Masibus' IN-SITU oxygen probe in % oxygen.

Provision for local/ remote and auto/ manual control modes are also provided. Similar custom control strategy is used for furnace draft control.

Standard tools like real time trends, custom reports, alarms and animated mimics are provided through PC based SCADA system for easy and flexible operator interface.

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Furnace Automation System

Performance

- Temperature variation can be optimized to be less than +/- 2%
- Percentage oxygen control can be less than 5%
- Temperature uniformity can be better than +/- 3 °C
- Heat losses and scale loss can be considerably reduced

Benefits

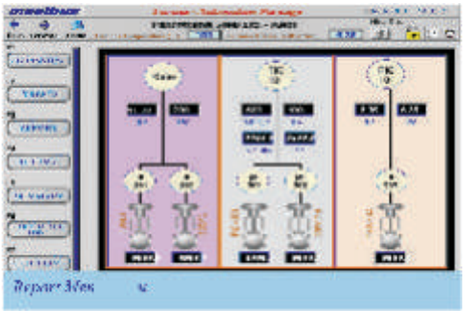
- Optimum combustion control leads to low fuel cost.
- Lower excess air reduces scale loss & saves cost.
- Temperature uniformity improves quality and reduces waste thereby saving cost.
- Auto temperature control improves productivity.
- MIS reporting helps to keep track of total production.

Other Opportunities

Furnace automation system has been our core business over three decades.

Masibus also provides automation systems for:

- Heat treatment furnace with atmosphere control.
- Bell furnace.
- Steckel mill.
- Bogie hearth annealing furnace.
- Electro regulation for EAF/ LF furnaces etc.

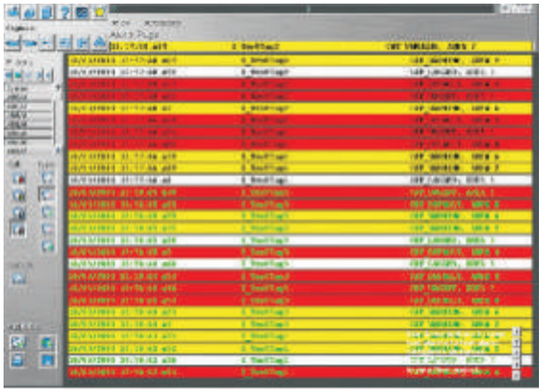


Doc.ref.CB-2/FAS/R0/0110

Energy Monitoring System (Model ENERMON)

System description

Masibus 2150 Power cum Energy Meters meters provide higher and sustained accuracy and reliability. These front end instruments provide communication port which is hooked up directly to the standard PC running ENERMON software (EMS-SCADA) which can generate good data-base along with history data. This provides information without holding-up the time of valuable maintenance personnel.



ENERMON can connect to Masibus' as well as all the 3rd party sophisticated energy/ power meters. The data from the meters are taken on RS-485/ ethernet bus and are communicated over SCADA work station, through suitable converters. The Energy Monitoring System works on master-slave configuration, where ENERMON is the master device and intelligent power meters are the slave on RS-485/ ethernet bus.

ENERMON displays energy parameters, its computation and final report generation on screen. Various parameters from different meters are displayed on same page which makes comparison easy. ENERMON's distributed trending feature handles a large number of variables without compromising on performance or data integrity with customizable views. Any electrical variable from any energy meter are made to be logged and trended.

ENERMON system also has trend compare facility where sample values are plotted against time on the same graph where real time trends were plotted, so as to provide indication of process behavior. Trend sampling rate are selectable between 1 second to 24 hours. Networking is the key ingredient of ENERMON to centralized monitoring of distributed application.

All features described are available on WAN/LAN. One can monitor autonomous area within the plant separately using any computer on the network. All the reports, alarm, trend are available in HTML format.

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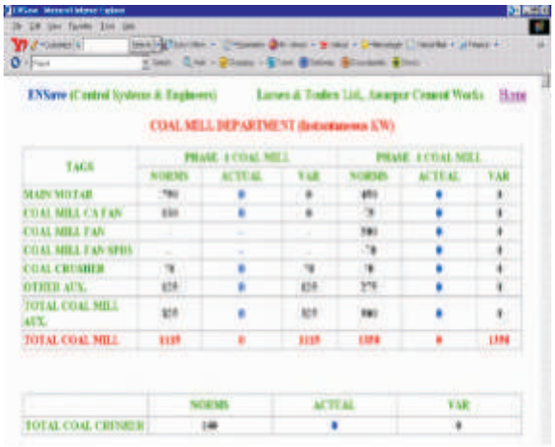
Energy Monitoring System (Model ENERMON)

Performance

ENERMON utilizes dynamic optimization and pre-emptive multitasking that optimizes the performance of the system. The communication is demand-based that reads only those tags that are requested by Client. The I/O server rationalizes requests from client and reduces needless communication giving screen update time faster than standard systems available in the market.

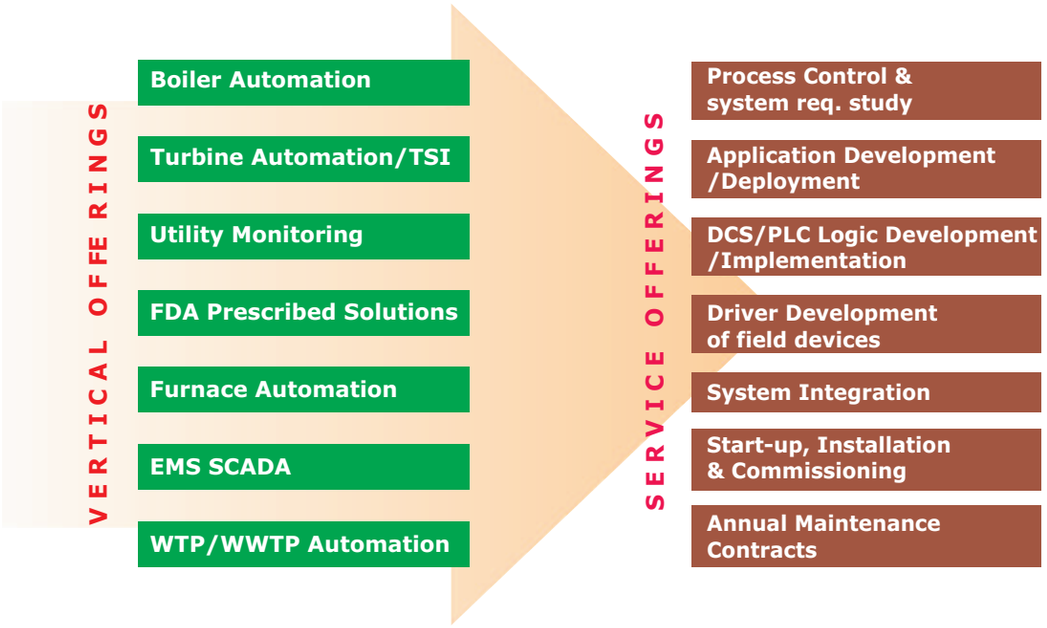


Features

- The Energy Monitoring System requirement is report intensive and ENERMON is developed to provide different reports to different sets of people.
- The metered data is gathered automatically, eliminating transcription errors and thereby provides real time energy.
- Computation and allocation of distribution losses are easy to know with ENERMON.
- Possible to locate inefficiencies from energy consumption pattern.
- Timely trouble shooting and stoppage of inefficiencies/ wastage based on reports leads to reduction of energy usage and costing.
- **Alarms:** The ENERMON generates alarms that are provided with detailed information in a clear and concise format with day, date, time and value.

Doc.ref.CB-2/ENERMON/R0/0110

INDUSTRIAL AUTOMATION SOLUTIONS



PARAMETERS WE CALIBRATE

Temperature

- Infrared / Optical / Non-contact Pyrometers / Thermometers.
- Blackbody Calibration Sources.
- Temperature Indicators / Controllers / Recorders / Scanners / Data Loggers.
- Temperature Calibrators / Simulators.
- RTD & Thermocouple type Temperature Sensors.
- Temperature Gauges.
- Temperature Calibration Baths.
- Soldering Irons.
- Glass Thermometers.

Pressure

- Pressure Gauges / Digital Pressure Indicators.
- Pressure Transmitters / Transducers.
- Pressure Calibrators / Pressure Modules.
- Dead weight Testers.

Electrical

- Multimeters / Voltmeters / Ammeters / Wattmeters / Ohm meters
- Resistance Decade Boxes.
- Power Supplies.

Energy

- Energy Transducers related to V/ I / W / Q / VA / VAR / Power Factor / Frequency parameters.

Customer Support

To offer excellent service & support, Masibus has its own Service Centers in four locations in the country. All service activities are managed by trained & experienced engineers who offer prompt services. Some of Masibus Dealers are also equipped to service & repair Masibus products.

Services Offered

- Technical support & training for Masibus products
- Annual Maintenance Contract of Masibus products which includes site visits, repairs at site & repairs at our Service Centers
- Servicing of Masibus products
- Up gradation of Masibus products
- Consulting Service for any application related to Masibus products.

- Site calibration job also undertaken.
- Training & Consultancy Service on calibration can be provided.
- Calibration Standards used in our CAL-LAB.

Condition Monitoring Services in Thermal Imaging and Vibration Analysis

MASIBUS TRAINING WORKSHOPS

Training That Counts

Leveraging our three decades of experience and knowledgebase in field of instrumentation, process control, industrial automation and condition monitoring, Masibus, an ISO 9000 – 2001 company, has commenced it's Technology Workshops with the objective of turning ordinary training into great learning experiences. They are structured to enhance your engineering expertise which will be a value addition to your professional growth. The multi dimensional experiences coming from experts in the related fields will increase your awareness, facilitate you to be more effective & achieve improved engineering services from your industrial set up. MTW brings the highest quality of training to professionals in the industry, be it an experienced engineer, practicing technician or a fresh engineer.

Training courses will initially be held at our facility in Gandhinagar and later on in major cities of our country & also at client's facility on request.

Approach to training:

To provide an excellent platform for in-house automation solutions by consulting & interacting with our automation experts.

To re-define the business through specialized training, Masibus has carefully structured all the programs to ensure that attendees gain maximum benefits. A combination of carefully designed training software, hardware, written documentation, together with multimedia presentations, ensures that the workshops combine theory & practicals.

Masibus training workshop is designed for :

- Professionals in engineering industries, this will serve as a refresher course & will improve their job oriented skill sets. Our training will help improve productivity, reduce implementation risk and reduce cost.
- For fresh recruits and budding engineers, this training will make them productive early in their career.

masibus TRAINING WORKSHOPS

(SCADA) - HMI/ SCADA Configuration Course Outline — 3 DAYS

SCADA has traditionally meant to be a window into the process of a plant or togather of data from devices in the field, but now the focus is on integrating this process data into the actual business and using it in real time.

The emphasis of the workshop is on practical industry topics highlighting recent developments using case studies. The latest application of SCADA technologies and the fundamentals of SCADA systems will be covered. The workshop is aimed at those who want to be updated on the latest developments in SCADA systems and want to get a good Understanding of the fundamentals of SCADA design, installation and troubleshooting

Who should attend?

Those who want to become familiar with SCADA project development techniques
SCADA users including engineering staff, maintenance staff and plant supervisors
Technical users who maintain and improve their installed SCADA and control systems
Managers who want more than a basic understanding of SCADA
SCADA System Integrators and Designers

HMI/SCADA Configuration Course Outline

DAY 1 of 3

Day one involves introduction to the various components of SCADA, project design, communications and graphics

- Project Editor
- Graphics Builder
- Program Editor
- Managing Projects
- Include Projects
- The Design Specification
- Setting up Communications
- Graphics
- True Color

DAY 2 of 3

Day two implements various areas of the project design including controls, alarms and the graphic interface design

- Commands & Controls
- Adv. graphictools
- Devices
- Events
- Alarm

DAY 3 of 3

Day three continues with the project design elements of SCADA and introduces methods of reporting and monitoring the system

- Trends
- Process Analyses tool
- Navigation
- Accumulators
- Reports
- Security

(PLC) - Workshop on Demystifying PLC — 2 DAYS

Course objective:

The aim of this intensive two-day course is to go beyond the basic concepts and introduce you to the practical techniques and applications (ICE) of 61131-3. If you ever need to program PLCs or just understand more about their capabilities, then this course is for you. If you are a trainee engineer, graduate engineer, control systems engineer, technician, or senior operator you will gain essential knowledge that will significantly enhance your existing knowledge of PLCs.

PLCs have become the backbone of industrial automation. The International Electro-technical Commission (IEC) has developed a standard set of programming languages for industrial PLCs. The success of these languages can be measured by the large number of major PLC manufacturers who are developing products that are 61131-3 compliant. IEC 61131-3 is becoming the standard of choice in many industries, and will boost productivity and enhance software quality. If you master the subject today your programming knowledge will be applicable across brands well into the future. This knowledge is vital for professional growth.

Course Program:

Introduction to PLC applications, hardware, memory structure of PLC.

- PLC Wiring
- Introduction to PLC programming software
- Ladder diagrams
- Upload / Download / Monitoring
- Advance instructions
- Fault finding / Documentation
- Communication with SCADA software
- Hands on experiment for real time applications

Who should attend?

Those who want to become familiar with SCADA project development techniques
SCADA users including engineering staff, maintenance staff and plant supervisors
Technical users who maintain and improve their installed SCADA and control systems
Managers who want more than a basic understanding of SCADA
SCADA System Integrators and Designers

(IDC) - Practical Data Communication & Industrial Networking — 2 DAYS

Course objective:

This workshop is designed for personnel who need to understand the techniques required to use and apply industrial communications technology as productively and economically as possible.

In modern manufacturing and process industries, the challenge for engineers and technicians is to make more effective use of modern control systems and “Smart” instruments by linking them together with Data Communication systems that are correctly designed and implemented to fully utilize the available technology. This Practical Data Communication and Networking workshop is designed to benefit instrumentation engineers and technicians who have little previous experience in Data Communications and are involved in specifying, commissioning and debugging Data Communications and Networking systems for instrumentation and control in the industrial environment. This workshop has been structured to cover the main concepts of Data Communications, to clarify their meaning and to describe their applications in a modern process and control system.

Course Program:

- The fundamentals of data communications
- How to troubleshoot RS-232 & RS-485 links
- How to install communications cables
- The essentials of industrial Ethernet & Local Area Networks
- How to troubleshoot protocols such as Modbus
- The fundamentals of FieldBus & DeviceNet standards

Who should attend?

Anyone with a need to understand the techniques required to use and apply industrial communications technology as productively and economically as possible, like

- Instrumentation & Control Engineers
- Process Control Engineers / Electrical Engineers
- Control System Engineers / Consulting Engineers
- Maintenance Supervisors
- Control Systems Applications Engineers

SCADA
PLC
IDC
CAL
ICS
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WIA
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TPM

(CAL) - Workshop on Calibration — 2 DAYS

Course objective:

This workshop is designed to basics you to the Calibration introduce, its requirement and benefits, some calibration terms, measurement uncertainty and Temperature & Pressure Calibration. The aim of this workshop is to provide you with the skills and fundamentals required for any calibration process.

The course covers specification of laboratory reference equipments, testing & calibration techniques including documentation, traceability, and uncertainty evaluation as required by ISO/IEC guidelines.

Course Program:

- Understand Calibration, Its basic requirements and benefits
- Be able to select the Reference Calibration Standard
- Understand Calibration Terms and its importance
- Be able to estimate the Measurement Uncertainty
- Be able to establish the system to comply the ISO 9001:2008–Calibration Requirements
- Be able to decide the Calibration Interval and balance between cost of calibration and loss because of Calibration problem
- Understand Temperature Calibration and it's techniques
- Understand Pressure Calibration and its techniques.

Who should attend?

- Calibration Engineer / Technician
- Instrumentation Engineer / Technician
- Maintenance Engineer / Technician
- QA / QC Engineer / Technician
- Process control Engineer / Technician

(ICS) - Tuning of Industrial Control System — 2 DAYS

Course objective:

This workshop is designed to introduce you to the techniques of tuning industrial control systems, the aim of this workshop is to provide you with the skills and fundamentals required to tune controllers for optimum performance, real process dynamics are simulated and controlled to reinforce the concepts discussed.

Course Program:

- Know how to characterize the dynamic response of an industrial process
- Be able to measure the dynamic parameters of a process
- Be able to select performance criteria and tune feedback controllers
- Be able to pick the right controller modes and tuning parameters that match the objectives of the control system
- Understand the effect of sampling frequency on the performance of computer-based controllers
- Know when to apply and how to tune cascade, feed-forward, ratio, and multivariable control systems
- Be able to apply adaptive and auto-tuning control strategies to compensate for process nonlinearities

Who should attend?

- Instrumentation and control engineers
- Process control engineers
- Operators controlling processes
- Automation engineers
- Systems integrators

(WIA) - Wireless for Industrial Automation — 2 DAYS

Course Objective:

Designed for personnel with a need to understand the techniques required for using and applying wireless communications technology as productively and economically as possible, this workshop will also provide you with a clear understanding of the choices available in designing and implementing your own wireless network.

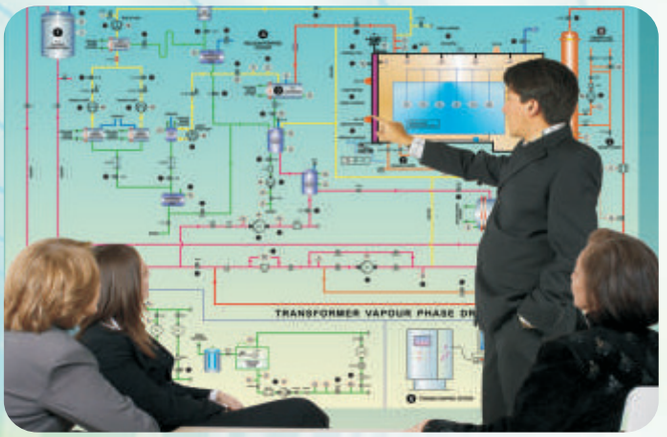
The use of wireless communications is being rapidly implemented in the industrial environment with great success provided certain ground rules are applied, such as ensuring a robust wireless link, correct integration with the wired communications systems and proper data security. The most important objective of wireless communications networks must be to achieve similar capacities, bandwidths, responsiveness and availability to that of wire based communications. This workshop commences with an overview of wireless communications and how radio works. A detailed examination is then made of Wireless Personal Area Networks or WPANs (Bluetooth/ IEEE 802.15) which are similar to their wired counterparts but based on radio. Wireless Local Area Networks or WLANs (IEEE 802.11) are then reviewed with a practical comparison to the standard wired LANs. Wireless Wide Area Networks are then examined with an emphasis on how they are expanding to provide broadband services.

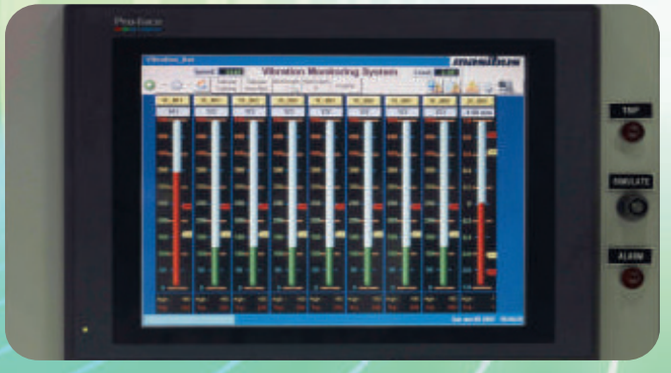
Course Program:

- Implementation limits, practical limits associated with wireless technology and integration of sensor, computer and actuator current
- Future technologies of industrial applications.

Who should attend?

- Application Engineer/ Manager
- Embedded design engineer / Manager
- Instrumentation Engineer / Manager





(VIB) - Practical Approach to Vibration Monitoring & Protection — 2 DAYS

Course Objective:

The aim of vibration monitoring is to detect of changes in the vibration condition of the object under investigation during its operation. The vibration measurements can be conducted without any change in the operation mode of the object. Practical training workshop on vibration monitoring is aimed to simplify the vibration measurement technology for practical use.

Course Program:

- Value of Condition Monitoring
- Fundamentals of Vibration
- Instrument & Sensor
- Vibration Measurement
- Vibration Analysis
- Workshop practice

Who should attend?

Professionals working in industry who desire to know the fundamentals of Vibration measurement in rotating machines and the best practices in the use of vibration as condition monitoring techniques for design / maintenance / trouble-shooting in Control & Instrumentation systems would find this course a tremendous value addition to their skills.

- Instrument Engineers
- Maintenance Engineers
- Sr. Engineer & Asst. Engineer
- Trainees & Technicians

(TPM) - Industrial Temperature/ Pressure Measurement Workshop — 2 DAYS

Course Objective:

Practical training workshop on Industrial temperature and pressure measurement technology in industry.

Who should attend?

Professionals working in any industry having desire to know about best practices in the use of temperature and pressure measurement techniques to design / maintain / trouble-shoot in Control & Instrumentation systems would find this course a tremendous value addition to their skills. Basic knowledge of instrumentation engineering is required.

Course Program:

DAY 1

Introduction
- What is Instrumentation and Controls (I&C)?
- Selection Of Measurement And Control Devices
- Electrical/Electronic Considerations, Communication
- Safety, Equipment Location, Performance
- Air Supply, Electrical Supply, Grounding
- Installation And Maintenance
- Process Data Sheets
- Engineering contractor scope of work
- Package equipment scope of work

Pressure Measurement
- Overview, Comparison Table for application and selection
- Units of Measurement
- Gauges, Transmitters (DCSs)
- Accessories: Seals, Snubbers, Calibrators and Manifolds
- Installation
- Instrument Specification Sheets

DAY 2

Temperature Measurement
- Overview, Comparison Table for application and selection
- Thermo wells
- Thermocouple
- Resistance Temperature Detector (RTD)
- Infrared Pyrometers
- Instrument Specification Sheets

Alarm And Trip Systems
- Overview
- Fail-Safe and De-energize-to-Trip
- Elements (Inputs, Logic, Output)
- Design, Documentation
- Testing (Input, Logic, Output)
- Management of Change

Enclosures
- Overview, General Requirements
- Documentation, Fabrication, Protection and Rating
- Electrical, Pneumatics
- Temperature and Humidity Control
- Inspection and Testing, Certification, Shipping

Besides the Course.....

- You will participate in practical sessions.
- Learn about diagnostic features and how to use them.
- Learn practical tips & tricks on trouble shooting.

(ITH) - Workshop on Industrial Thermography 2 DAYS

Course Objective:

Predictive maintenance helps ensure the equipment efficiency by detection of early faults. Thermography is the most effective condition monitoring technique used to isolate conditions that indicate impending failure. Our training workshop on Industrial Thermography is aimed at developing imaging and analytical skills in troubleshooting day to day faults.

Course Program:

- Industrial Maintenance Fact
- Fundamentals of Thermodynamics related to maintenance
- Concept of Electromagnetic spectrum range
- Impact of Heat transfer theory in maintenance
- Temperature measurement technique with demo exercises
- Application of Thermography in Industries & case study
- Infra-red software handling & work shop practice
- Thermography reporting & presentation

Who should attend?

- Facility management personnel of Datacenter / IT firm
- Electrical / Mechanical Maintenance personnel in any industry
- Condition Monitoring Personnel
- Building Surveyors / Service providers

(BCS) - Workshop on Boiler Control Engineering 2 DAYS

Course Objective:

This workshop is designed to enable the Instrumentation Engineer, Boiler Operation Engineer and Boiler Manufacturer to understand, configure and simulate the critical parameters of the boiler, build the control strategy and Fine tune the parameters to optimize Boiler Efficiency.

Course objectives:

- Be able to appreciate the Air & Flue Gas Cycle, Water & Steam Cycle for Boiler
- Be able to Configure Algorithms for Critical Measurements like Drum Level Measurement, Steam Flow Measurement, Feed Flow Measurement and Air Flow Measurement
- Be able to build auto control strategy for Single Element, Two Element & Three Element Drum Level control and simulate the performance on simulator
- Be able to appreciate the control strategy for combustion control, Furnace draft control and Steam temperature control
- Understand the Safety and Fail Safe features incorporated in boilers
- Able to select suitable flame scanners for Boiler Flame monitoring
- Able to select the suitable Gas and Liquid Analyzers for performance monitoring of the boiler
- Able to appreciate the Boiler Efficiency Calculation and simulate the effect of Key parameters on simulator
- Explore the coordinated control strategy for Boiler, Turbine and Generator Load.

Who should attend?

- Instrumentation Engineers and technicians
- Boiler Operation Engineers
- Boiler Manufacturers
- Boiler Plant Commissioning Engineers

For details mail to training@masibus.com or call at 98985 86951

MASIBUS TRAINING WORKSHOPS

MASIBUS TRAINING WORKSHOPS
Training That Counts

COURSE SCHEDULE 2010 • QUARTER 1

MONTH	JANUARY					FEBRUARY					MARCH				
DATE	4•5	6•7	8•9	11•12	15•16	2•3	4•6	8•9	10•11	12•13	3•4	5•6	8•9	10•11	12•13
COURSE															
SCADA							■								
PLC										■					
IDC									■						
CAL						■									
ICS								■							
BCS					■							■			
WIA	■												■		
VIB				■											■
ITH		■												■	
TPM			■								■				

COURSE SCHEDULE 2010 • QUARTER 2

MONTH	APRIL					MAY					JUNE				
DATE	6 • 8	9 • 10	12 • 13	16 • 17	19 • 20	5•6	7•8	11•12	13•14	17 • 18	1•2	3 • 4	7 • 8	9 • 11	14 • 15
COURSE															
SCADA	■													■	
PLC		■													■
IDC				■									■		
CAL			■								■				
ICS					■							■			
BCS						■									
WIA										■					
VIB									■						
ITH								■							
TPM							■								

COURSE SCHEDULE 2010 • QUARTER 3

MONTH	JULY					AUGUST					SEPTEMBER				
DATE	5 • 6	7•8	12 • 13	16 • 16	19 • 20	2 • 3	5 • 7	9 • 10	12•13	17•18	2•3	6 • 7	8 • 9	13 • 14	13 • 16
COURSE															
SCADA							■								
PLC									■						
IDC								■							
CAL						■									
ICS										■					
BCS	■											■			
WIA				■									■		
VIB		■									■				
ITH					■									■	
TPM			■												■

COURSE SCHEDULE 2010 • QUARTER 4

MONTH	OCTOBER					NOVEMBER					DECEMBER				
DATE	4 • 5	6 • 7	11 • 13	14 • 15	18 • 19	10 • 11	12 • 13	15 • 16	17 • 18	19 • 20	2 • 4	6 • 7	8 • 9	13 • 14	15 • 16
COURSE															
SCADA			■								■				
PLC					■									■	
IDC				■											■
CAL		■											■		
ICS	■											■			
BCS							■								
WIA									■						
VIB						■									
ITH									■						
TPM										■					

SCADA
PRACTICAL SCADA TRAINING

PLC
WORKSHOP ON DEMYSTIFYING PLC

IDC
INDUSTRIAL DATA COMMUNICATION & N/W

CAL
WORKSHOP ON CALIBRATION

ICS
TUNING OF INDUSTRIAL CONTROL SYSTEM

BCS
WORKSHOP ON BOILER CONTROL SYSTEM ENGR.

WIA
WIRELESS FOR INDUSTRIAL AUTOMATION

VIB
WORKSHOP ON VIBRATION FOR INSTRUMENTATION

ITH
WORKSHOP ON INDUSTRIAL THERMOGRAPHY

TPM
WORKSHOP ON TEMPERATURE & PRESSURE MEASUREMENT

FEE STRUCTURE:

NAME OF TRAINING MODULE	COURSE FEE
PRACTICAL SCADA TRAINING	8000/-
WORKHOP ON DEMYSTIFYING PLC	7500/-
INDUSTRIAL DATA COMM. & N/W	6000/-
WORKSHOP ON CALIBRATION	5000/-
TUNING OF INDUSTRIAL CONTROL SYSTEM	6000/-
WORKSHOP ON BOILER CONTROL SYSTEM ENGR.	7500/-
WORKSHOP ON WIRELESS FOR INDUSTRIAL AUTOMATION	7500/-
WORKSHOP ON VIBRATION FOR INSTRUMENTATION	7500/-
WORKSHOP ON INDUSTRIAL THERMOGRAPHY	7500/-
WORKSHOP ON TEMP. & PRESSURE MEASUREMENT	6000/-

Terms & conditions:
Service Tax @ 10.30% is applicable.

Notes

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