DIN Integra 2000 Series

A single multi-functional Integra 2000 digital metering system replaces numerous single-function instruments, providing significant cost savings and reduced wiring times for all power monitoring applications. Integra 2000 digital metering systems provide high accuracy true rms measurement and display of up to 103 electrical and power quality parameters.

Status information can be monitored via the high contrast graphical LCD display with LED backlight, which is ideally suited for low ambient light conditions. Alternatively, optional pulsed, analogue and digital communication outputs allow status information of measured parameters to be communicated into building management systems.

Operation

A five-button menu driven interface on the front panel of Integra 2000 enables the simple programming of VT and CT ratios, configuring selected communication options and adjustment of operating parameters.

Integra 2000 provides simple and quick access to the measured electrical data, with active reading screens typically presenting in a 4-line 4-digit format. The default screen is factory set to display volts, amps, frequency and watts, but can be customised to display any four measured parameters. User-friendly soft prompts are assigned to each of the four main parameter buttons, guiding the user easily through the menu structure to configure and monitor chosen parameters with a minimum number of button presses.

To prevent unauthorised access to configuration settings, all set-up screens offer password protection. Once configured, status information can be viewed by scrolling through up to 42 backlit dot-matrix LCD screens featuring different character font sizes for maximum clarity. Optional pulsed, analogue or digital outputs allow status information of measured parameters to be communicated into building management systems.

System Input

Designed for all low, medium and high-voltage switchgear and distribution systems, the Integra 2000 offers programmable VT and CT ratio capability. The unit is suitable for direct connection to many common voltages with 5A CT inputs.

System Outputs

Pulsed Outputs

Integra 2000 offers two pulsed outputs enabling the retransmission of time-based parameters. Each relay can be assigned to kWh or kVArh (import or export) kVAh and kAh, and will pulse at a rate proportional to the measured active energy, with both pulse width and rate easily programmable. The output relays have fully isolated volt free contacts, with connection via screw-clamp terminals.

Analogue Outputs

Four analogue outputs may also be included, enabling onward transmission of linear parameters using industry standard analogue signalling. Each 4/20mA analogue channel can be assigned to one of 44 measured parameters.

Digital Communications

RS485 Modbus RTU

Integra 2000 digital metering systems offer an RS485 communication port for direct connection to SCADA systems using either the Modbus RTU, or the Johnson Controls Metasys NII protocols. Remote monitoring enables the user to record system parameters in real time, using high resolution numbers. The Modbus protocol establishes the format for the master's query by placing it into the device address. The slave's response is also constructed using the Modbus protocol; it contains the fields confirming the action taken, the data to be returned, and an error-checking field.

Lonworks Interface

The Lonworks interface option is designed according to the LonMark Interoperability Guidelines version 3.2. This ensures Integra digital metering systems can be integrated into a single control network without requiring custom node or network tool development.

Features

Measurement, display and communication of up to 103 electrical and power parameters
High contrast LCD display with LED backlight
True rms measurement
Pulsed, analogue and digital communications
Modbus, Johnson Controls and Lonworks interface options
Fully programmable VT and CT ratios

Benefits

Replaces multiple single function instruments
Significant cost savings
Reduced wiring times
Simple menu driven interface
User definable outputs and scaling
Accurate at 4 quadrant power factors
Import and export monitoring

Applications

Switchgear
Distribution systems
Generator sets
Control panels
Embedded generation
Energy management
Building management
Utility power monitoring
Process control
Motor monitoring
Feeder panels
Distribution pillars

Compliant With

IEC1010/BSEN 61010-1
IEC 664, VDE 0110, PD 6499

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Measurement, Display and Communication

Integra 2000 unit offers configuration, display and configuration of up to 103 electrical and power quality parameters.

1 System volts
System amps
Frequency
System kW

2 Volts L1-N (4-wire only)
Volts L2-N (4-wire only)
Volts L3-N (4-wire only)
Volts L-N (average)

3 Minimum volts L-N (per phase)

4 Maximum volts L-N (per phase)

5 Volts L1-L2
Volts L2-L3
Volts L3-L1
Volts L-L (average)

6 Minimum volts L-L (per phase)

7 Maximum volts L-L (per phase)

8 Current L1
Current L2
Current L3
Current (average)

9 Minimum current (per phase)

10 Maximum current (per phase)

11 Current demand
Current maximum demand

12 System frequency
Minimum frequency
Maximum frequency

13 System watts (sum)
System VArs (sum)
System VA (sum)
Power factor sys

14 Watts L1
Watts L2
Watts L3
Watts sum

15 Minimum watts (per phase)

16 Maximum watts (per phase)

17 VAr L1
VAr L2
VAr L3
VAr sum

18 Minimum VArs (per phase)

19 Maximum VArs (per phase)

20 VA L1
VA L2
VA L3
VA sum

21 Minimum VA (per phase)

22 Maximum VA (per phase)

23 Power factor L1
Power factor L2
Power factor L3
Power factor sys

24 Phase angle L1
Phase angle L2
Phase angle L3
Phase angle sys

25 KWh import (8-digit resolution)
KWh export (8-digit resolution)
KVArh import (8-digit resolution)
KVArh export (8-digit resolution)
VAh (8-digit resolution)
Ah(8-digit resolution)

26 kW demand (import)
kW maximum demand (import)
kW demand (export)
kW maximum demand (export)

Programmable Parameters

Parameter	Range
Password:	4-digit 0000-9999
Primary current:	Max 999.9kA (999MW max**)
VT primary:	999.9kV (999MW max**)
** maximum VT or CT ratios are limited so that the combination of primary voltage and current does not exceed 999MW at 120% of relevant input	
Reset:	Individual energy registers, minimum and maximum registers, demand registers
Demand integration time:	1-30 minutes
Demand sub-intervals	1-30 minutes
RS485 interface baud rate:	2.4, 4.8, 9.6, 19.2 kB
RS485 parity:	Odd, even, none
Stop bits:	1, 2
Modbus address:	1-247
Analogue output assignment:	Pick list of 44 measured parameters
Pulse output assignment:	Import kWh, export kWh, import VArh, export VArh, VAh, Amph, none
Pulse rate divisors:	1, 10, 100, 1000
Pulse output duration:	20-200 milliseconds
User screen:	4 lines, choice of 42 measured parameters
Display update rate (override):	1-20

Product Codes

Product code	Product configuration
244-INMW-*-**	Integra 2000 3-phase 3-wire, 5A CT input
Input voltage suffix *	
VUA2	100V L-L input, 100-250V ac/dc auxiliary
QPA2	110V L-L input, 100-250V ac/dc auxiliary
BFA2	115V L-L input, 100-250V ac/dc auxiliary
PQA2	120V L-L input, 100-250V ac/dc auxiliary
VUA5	100V L-L input, 12-48V dc auxiliary
QPA5	110V L-L input, 12-48V dc auxiliary
BFA5	115V L-L input, 12-48V dc auxiliary
PQA5	120V L-L input, 12-48V dc auxiliary

Product code	Product configuration
244-INWW-*-**	Integra 2000 3-phase 4-wire, 5A CT input
Input voltage suffix *	
VQA2	220V L-N input, 100-250V ac/dc auxiliary
VRA2	230V L-N input, 100-250V ac/dc auxiliary
QSA2	240V L-N input, 100-250V ac/dc auxiliary
RSA2	250V L-N input, 100-250V ac/dc auxiliary
PGA2	254V L-N input, 100-250V ac/dc auxiliary
QYA2	277V L-N input, 100-250V ac/dc auxiliary
VQA5	220V L-N input, 12-48V dc auxiliary
VRA5	230V L-N input, 12-48V dc auxiliary
QSA5	240V L-N input, 12-48V dc auxiliary
RSA5	250V L-N input, 12-48V dc auxiliary
PGA5	254V L-N input, 12-48V dc auxiliary
QYA5	277V L-N input, 12-48V dc auxiliary

Communication options**	
000000	No outputs
4800P2	RS485 Modus, 2 pulse relays
48A2P2	RS485, 4 x 4/20mA analogue outputs, 2 pulse relays
JC00P2	RS485 Johnson Controls, 2 pulse outputs
JCA2P2	RS485 Johnson Controls, 4 x 4/20mA analogue outputs, 2 pulse relays
LN0000	Lonworks interface

Order Code Example

244-INWW-VRA2-4800P2 - Integra 2000 3-phase 4-wire, input 230V L-N nominal voltage, 5A CT input, 100-250V ac/dc auxiliary, with RS485 Modbus and two pulse relay outputs.

Specifications

Input	
Nominal input voltage:	220-277V L-N, 100-120V L-L
Max continuous input voltage:	120% nominal
Max short duration input voltage:	2 x for 1 second, repeated 10 times at 10 second intervals
System VT ratios (primary):	Any value up to 999.9 kV
Nominal input voltage burden:	0.2VA
Nominal input current:	5A
System CT primary values:	Any value up to 999.9 kA
Max continuous input current:	120% nominal
Max short duration current input:	20 x for 1 sec, repeated 5 times at 5 min intervals
Nominal input current burden:	0.6VA
	** maximum VT or CT ratios are limited so that the combination of primary voltage and current does exceed 999MW at 120% of relevant input
Outputs	
RS485 communications:	2-wire half duplex
Baud rates:	2400, 4800, 9600, 19200
Pulsed:	Clean contact SPNO, 100V dc 0.5A max
Pulse duration:	20-200 milliseconds (20ms steps)
Pulsed outputs:	2
Analogue outputs:	4 x 4/20mA into 500Ω (requires external dc supply, 16-27V)
Auxiliary	
Standard nominal supply voltage:	100-250V ac or dc
AC supply frequency range:	45-66Hz
AC supply burden:	6VA
Optional auxiliary dc supply:	12-48V dc
DC supply burden:	6VA
Measuring ranges	
Voltage	10-100% of nominal (functional 5-120%)
Current:	10-100% of nominal (functional 5-120%)
Frequency:	45-66Hz
Power factor:	-1/0/1/0/-1 (functional 4 quadrant, 0-1 lag/lead)
Energy:	8 digit resolution
Accuracy	
Voltage:	0.5% of reading ± 4-digits
Current:	0.5% of reading ± 4-digits
Frequency:	0.1% of mid frequency ± 2 digits
Active power:	1% of reading ± 4-digits
Power factor:	1% of reading ± 4-digits
Reactive power (VAr):	2% of reading ± 4-digits
Apparent power (VA):	2% of reading ± 4-digits
Neutral current calculated:	4% of end scale
Energy:	1% of reading ± 4-digits
KVArh	2% of reading ± 4-digits
Temperature coefficient:	±0.013%/°C typical
Update time:	Display: 1 second Optional digital port: 200ms
Analogue output:	1.5% of end scale
Enclosure	
Enclosure style:	DIN 96 panel mount
Compliant with:	IEC 1010/BS EN 61010-1, IEC 664, VDE 0110, PD 6499, EMC and LVD
Material:	Polycarbonate
Terminals:	Shrouded screw-clamp
Fixing:	2 corner clamps and thumb screws
Dielectric voltage:	Withstand test 2.2kV rms between inputs & auxiliary 1kV rms between outputs & auxiliary
Operating temperature:	0 to +50°C
Storage temperature:	-20 to +65°C
Relative humidity:	0-95% (non condensing)
Shock:	30g in 3 planes
Vibration:	10-15Hz, 1.5mm peak to peak / 15-150Hz @1g
Front of panel IP protection:	IP54
Dimensions:	96mm high x 96mm wide x 156mm deep 3.78" wide x 3.78" wide x 6.12" deep
Panel cut-out:	92mm x 92mm, 3.62" x 3.62"

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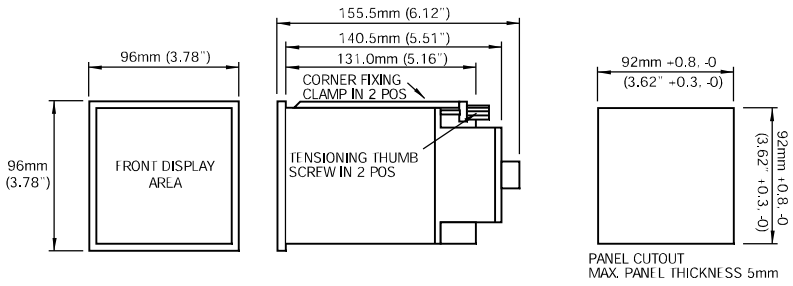
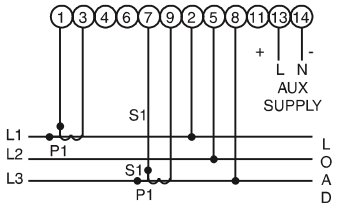
Dimensions



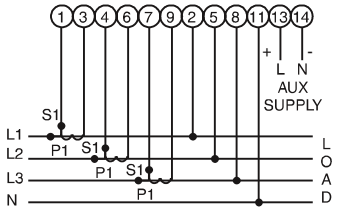
Wiring

Input connections are made directly to shrouded screw-clamp terminals. Terminals for both current and voltage connections are sized to accept two #12 AWG (3mm²) solid or stranded wires. Connections for digital interface, pulsed and analogue options are via screw-clamp connectors. Connectors offer retained wire protection leaves suitable for one #13 AWG (2.5mm²) solid or stranded wire.

3-phase 3-wire unbalanced load



3-phase 4-wire unbalanced load



Import and Export Connections

The connection diagrams shown assume an import power configuration, therefore power factor is shown as import (IMP) and current will flow towards the load. If current flows away from the load, in an export power situation, then the power factor indication will change to export (EXP). As Integra 2000 serves the full four power factor conditions separate export connections are not required.

Auxiliary Supply

The Integra 2000 should ideally be powered from a dedicated supply, either 100-250V ac/dc or 12-48V. However the device may be powered the signal source, provided the source remains within the working range of the chosen auxiliary supply.

Fusing

It is recommended that all voltage lines are fitted with 1 amp fuses.

Safety/Ground Connections

For safety reasons, CT secondary connections should be grounded in accordance with local regulations.