

DIN Integra 1530 Series

Multi-function Integra 1530 digital metering systems provide high accuracy <0.2% measurement, display and communication of all major electrical and power quality parameters, including true rms system values, power quality data and total harmonic distortion (THD) measurement up to the 31st harmonic. To meet customer requirements, the range comes in single-phase, single-phase 3-wire, 3-phase 3-or 4-wire, and 3-phase 4-wire with neutral CT configurations.

This DIN 96 panel mounted enclosure offers simple programming and display of up to 34 power measurement parameters via a simple menu driven user interface on the front panel. Integra 1530 provides optional pulsed, analogue and digital communication outputs, allowing the communication of enhanced status information of up to 50 measured parameters into building management systems. Additionally, a simple Windows-based software package is available to remotely configure, monitor and communicate all 50 major electrical and power quality parameters.

Operation

Integra 1530 offers uncomplicated operation and high accuracy <0.2% measurement of three phase voltage, current, frequency, watts, VAr, VA, energy, power factor, and total harmonic distortion measurement of both phase and system, current and voltage. Usually 3-phase 4-wire system line-to-line voltage measurements are usually derived from calculating the vector of line-to-neutral voltage measurements. However, Integra 1530 readings even under phase fault conditions by providing true measurement of both line-to-neutral, and line-to-line measurements.

For individual power monitoring applications, the Integra 1530 offers simple programming and display, via the menu driven interface. An optional Windows-based software configuration package can be used for remote configuration and monitoring. Up to 50 electrical and power quality variables can be communicated into building management systems via pulsed, analogue or digital communication options.

Functionality is easily enhanced to meet new client expectations. Integra pre-calibrated plug-in option cards allow cost effective upgrades with any combination of pulsed, analogue and digital communication outputs. Cards slot simply into the back of the unit and products do not need to be removed from the installation or recalibrated.

Accuracy

Integra 1530 digital metering systems utilise true rms measurement techniques up to the 31st harmonic, providing <0.2% accuracy. The robust frequency detection method, able to lock the fundamental frequency onto any phase, results in an exceptional tolerance to high harmonic frequencies. High integrity measurements are possible where the system approximates CT current in the absence of voltage signals.

System Input

Designed for all low, medium and high voltage switchgear and distribution systems, the Integra 1530 offers programmable VT and CT ratio capability. Direct connection for up to 480V ac with 5A CT inputs is standard, and 1A CT inputs available as an option.

Neutral CT Input Option

High harmonic environments can produce unexpected and dangerous neutral currents. Traditional 3-phase systems are only able to calculate the vector of line-to-neutral current measurements, which may not register the true reading. Integra 1530 offers a 3-phase 4-wire version with a neutral 4th CT, allowing true neutral current measurement and protection in high harmonic environments.



Features

- Measure and display up to 34 electrical and power parameters
- Measure and communicate up to 50 electrical and power parameters
- High-contrast red LED display
- LED annunciators for each measured parameter
- THD measurement and power quality data to 31st harmonic
- True rms measurement
- Pulsed, analogue and digital outputs
- Modbus, Johnson Controls, Lonworks and Profibus interface options
- Fully programmable VT and CT ratios

Benefits

- Replaces multiple single function instruments
- Pre-calibrated plug-in options
- High accuracy <0.2%
- Configurable via software package or menu driven interface
- Import and export monitoring
- Neutral CT input option
- True 3-and 4-wire measurement

Applications

- Switchgear
- Distribution systems
- Control panels
- Embedded generation
- Energy management
- Building management
- Utility power monitoring
- Process control
- Motor monitoring

Compliant With

- UL file no: E20300
- UL 61010B-1
- IEC 1010-1/BSEN 61010-1 CAT III

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System Outputs

Pulsed Outputs

Integra 1530 digital metering system provides optional single or dual-pulsed outputs enabling the retransmission of kWh and kVARh time-based parameters. Outputs are pulsed proportionally to the measured kWh active energy, with pulse width and rate easily programmable either locally or remotely. Output relays have fully isolated volt-free contacts, with screw-clamp connection terminals.

Analogue Outputs

Supplies up to two analogue outputs, enabling onward transmission of linear parameters with industry standard analogue signals. Each analogue channel can be assigned to one of 47 measured parameters with an output span fully adjustable to customer requirements and can be configured to operate in normal, reverse, threshold or constant current modes. Both analogue outputs share a common return which is galvanically isolated from non-analogue output terminals.

Digital Communications

RS485 Modbus RTU

Integra 1530 digital metering systems offer a RS485 communication port for direct connection to SCADA systems using Modbus RTU or 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 Modbus protocol; it contains the fields confirming the action taken, the data to be returned, and an error-checking field. The Modbus option includes function 8 subfunction 0, which provides return query data diagnostic support, and the ability to change Modbus word order to suit user requirements.

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.

Profibus

The Profibus interface option allows Integra 1530 to communicate over a Profibus-DP network as a slave device. Integra can automatically detect the master's baud rate and communicates at data rates of up to 12Mbit via a Profibus standard 9-way D type connector over the optically isolated RS485 port. The interface supports standard DP protocol functionality, Class 1 and Class 2 services and networks can be configured using the GSD file.

INT-SOFT Communication and Configuration Software

Configuration of system parameters, outputs, pulsed relays, current and power demand are easily programmed through the INT-SOFT Windows style user interface, installable on any PC running Windows 95, NT or 2000. Communication to Integra 1530 is made with a Modbus connection to a PC COM port via a RS485/RS232 converter.

Configuration software allows the user to load and save configurations to a PC hard disk and to send and retrieve settings directly from the Integra 1530. Settings can also be copied between individual Integra units.

Status information is usually communicated into a building management system, but can also be monitored through the configuration software. The software queries the selected Integra 1530 every few seconds to obtain data, which can be viewed on a dedicated measurements page.

For more detailed information, please refer to the INT-SOFT Communication and Configuration Software section of this brochure.

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Programmable Display

A two-button interface on the front panel of Integra 1530 units enables the simple programming of VT and CT ratio settings, configuring selected communication options, and adjusting operating parameters. To prevent unauthorised access to configuration settings, all set-up screens offer password protection. Once configured, status information can be viewed by scrolling through 15 screens featuring a high contrast 3-line, 4-digit LED display with separate annunciators for each of the 34 measured parameters. Optional pulsed, analogue or digital outputs allow enhanced status information of up to 50 measured parameters to be communicated into building management systems.

Programmable Parameters

Parameter	Range
Password:	4-digit, 0000-9999
Primary current:	Max 9999:5A (360MW max**)
VT primary:	400kV (360MW max**)
Secondary voltage:	Nominal system voltage
	** maximum VT and CT ratios are limited so that the combination of primary voltage and current does not exceed 360MW at 120% of relevant input
Demand integration time:	8, 15, 20, 30 and 60 minutes
Reset:	Max demand & active energy registers
Pulse output duration:	60, 100, 200 ms
Pulse rate divisors:	1, 10, 100, 1000
RS485 interface baud rate:	2.4, 4.8, 9.6, 19.2kB
RS485 parity:	Odd / even / no, 1 or 2 stop bits
Modbus address:	1-247
Analogue outputs:	User definable

Specifications

Input	
Nominal input voltage:	57.7 to 277V L-N, 100 to 480V L-L
Max continuous input voltage:	120% of 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 400kV **
Nominal input voltage burden:	< 0.2 VA
Nominal input current:	5A (1A option)
System CT primary values:	9999:5A or 9999:1A max 360MW **
Max continuous input current:	120% nominal
Max short duration current input:	20 x for 1 second, repeated 5 times at 5 second intervals
Nominal input current burden:	< 0.6 VA
	** maximum VT and CT ratios are limited so the combination of primary voltage and current does not exceed 360MW at 120% of relevant input
Outputs (optional)	
RS485 communications:	2-wire half duplex
Baud rates:	2400, 4800, 9600, 19200
Pulsed:	Clean contact SPNO
Pulse duration:	60, 100 or 200 milliseconds
Pulsed outputs:	1 or 2
Analogue outputs:	1 or 2
Auxiliary	
Standard nominal supply voltage:	100-250V, ac or dc (85-287V, ac absolute) (85-312V, dc absolute)
AC supply frequency range:	45-66Hz
AC supply burden:	6VA
Optional auxiliary dc supply:	12-48V, dc (10.2-60V, dc absolute)
dc supply burden:	6 VA



Measurement and Display

Up to 34 electrical and power quality parameters can be configured and displayed on the Integra 1530 unit.

- System volts
System current
System kW
 - System volts THD %
System current THD %
 - Volts L1-N (4-wire only)
Volts L2-N (4-wire only)
Volts L3-N (4-wire only)
 - Volts L1-L2
Volts L2-L3
Volts L3-L1
 - Volts line 1 THD %
Volts line 2 THD %
Volts line 3 THD %
 - Current L1
Current L2
Current L3
 - Current line 1 THD %
Current line 2 THD %
Current line 3 THD %
 - Neutral current (4-wire only)
Frequency
Power factor
 - kVAr
kVA
kW
 - kWh import (7-digit resolution)
 - kVArh import (7-digit resolution)
 - kWh export (7-digit resolution)
 - kVArh export (7-digit resolution)
 - kW demand
Current demand
 - kW maximum demand
Current maximum demand
- Enhanced status information of up to 50 parameters can be communicated into building management systems via optional pulsed, analogue and digital outputs.

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Accuracy Definition

Error change due to variation of an influence quantity in the manner described in section 6 of IEC688:1992

2 * Error allowed for the reference condition applied in the test. Error in measurement when a measured quantity is within its measuring range, but outside its reference range.

2 * Error allowed at the end of the reference range adjacent to the section of the measuring range where the measured quantity is currently operating / being tested.

THD accuracy relates to a typical harmonic profile.

Specifications continued

Measuring ranges	
Voltage:	80-120% of nominal (functional 5-120%)
Current:	5-120% of nominal
Frequency:	45-66Hz
Power factor:	0.8 capacitive – 1 – 0.8 inductive (functional 4 quadrant, 0-1 lag/lead)
THD:	Up to 31st harmonic (0%-40%)
Energy:	7-digit resolution
Reference conditions	
Ambient temperature:	23° ± 1 °C
Input frequency:	50 or 60Hz ± 2%
Input waveform:	Sinusoidal (distortion factor < 0.005)
Auxiliary supply voltage:	Nominal ± 1%
Auxiliary supply frequency:	Nominal ± 1%
AC auxiliary supply waveform:	Sinusoidal (distortion factor < 0.05)
Magnetic field of origin:	Terrestrial flux
Accuracy	
Voltage:	± 0.17% of range maximum
Current:	± 0.17% of nominal
Frequency:	0.15% of mid frequency
Active power:	± 0.2% of range maximum
Power factor:	1% of unity
Reactive power (VAr):	± 0.5% of range maximum
Apparent power (VA):	± 0.2% of range maximum
THD:	± 1%
Neutral current calculated:	± 0.95% of nominal
Neutral current measured:	± 0.17%
Energy:	0.3% of range maximum (Better than class 1 IEC 1036 Sect 4.6)
KVArh:	0.6% of range maximum
Temperature coefficient:	Voltage & current typical: 0.013%/°C Neutral current typical: 0.018%/°C
Update rate:	second. Optional digital port: 250ms
Analogue output:	Panel mount
Enclosure:	IP54, UL61010B-1, IEC 1010-1/
Compliance:	BSEN 61010-1 CATIII, EMC and LVD
Material:	Polycarbonate
Terminals:	Shrouded screw-clamp
Dielectric voltage:	Withstand test 3.25kV rms 50Hz for 1 minute between all electrical circuits
Operating temperature:	-20 to +60 °C
Storage temperature:	-30 to +80 °C
Relative humidity:	0-90% (non condensing)
Warm-up time:	1 minute
Shock:	30g in 3 planes
Vibration:	10-15Hz, 1.5mm peak-to-peak / 15-150Hz @ 1g
IP protection:	IP54
Dimensions:	96mm wide x 96mm high x 149mm deep (max) 3.78" wide x 3.78" high x 5.87" deep (max)
Panel cut-out:	92mm x 92mm, 3.62" x 3.62"

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Product Codes

Product code	Product configuration					
INT-1531-***-option-****	Integra 1530 single-phase					
INT-1532-***-option-****	Integra 1530 single-phase 3-wire					
INT-1533-***-option-****	Integra 1530 3-phase 3-wire					
INT-1534-***-option-****	Integra 1530 3-phase 4-wire					
INT-1535-***-option-****	Integra 1530 3-phase 4-wire with neutral CT					
Input voltage suffix *						
L	100-240V L-L (57.7-139V L-N)					
M	241-480V L-L (140-277V L-N)					
Input range suffix **						
1	1A CT input					
5	5A CT input					
Auxiliary supply suffix ***						
L	12-48V dc					
M	100-250V ac/dc					
Communications options						
	<table border="0"> <tr> <td>KWh pulsed output</td> <td>RS485 Modbus or Johnson Controls Metasys NII</td> <td>Lonworks interface</td> <td>Profibus interface</td> <td>Analogue output</td> </tr> </table>	KWh pulsed output	RS485 Modbus or Johnson Controls Metasys NII	Lonworks interface	Profibus interface	Analogue output
KWh pulsed output	RS485 Modbus or Johnson Controls Metasys NII	Lonworks interface	Profibus interface	Analogue output		
000-display only						
001				1		
002				2		
010		1				
011		1		1		
012		1		2		
030			1			
050				1		
100	1					
101	1			1		
102	1			2		
110	1	1				
111	1	1		1		
112	1	1		2		
200	2					
210	2	1				
Analogue output range ****						
1	0-20 mA, 10V compliance (user configurable as 4-20mA, 0-10mA and 0-5mA)					
3	-1/0/+1 mA, 10V compliance (user configurable as 0-1 mA)					

Pre-calibrated plug-in options

Functionality of existing Integra 1530 units can be easily enhanced with Crompton pre-calibrated plug-in cards.

	KWh pulsed output	RS485 Modbus or Johnson Controls Metasys NII	Lonworks interface	Profibus interface	Analogue output
OPT-1530-002-1 (0-20mA)					2
OPT-1530-002-3 (-1/0/+1mA)					2
OPT-1530-010		1			
OPT-1530-012-1 (0-20mA)		1			2
OPT-1530-012-3 (-1/0/+1mA)		1			2
OPT-1530-030			1		
OPT-1530-050				1	
OPT-1530-200	2				
OPT-1530-210	2	1			



Order Code Example

INT-1534-M-5-M-110

Integra 1530 digital metering system, 3-phase 4-wire, nominal input voltage, 140-277V L-N and 241-480V L-L, 5A CT input, auxiliary supply 100 to 250V ac or dc, one relay pulsed output and one RS485 Modbus communication port.

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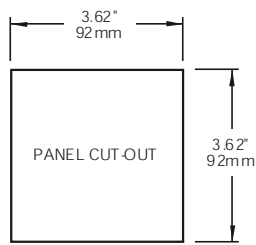
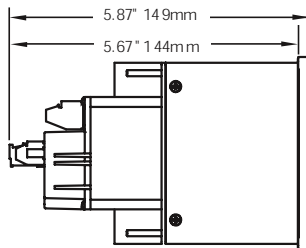
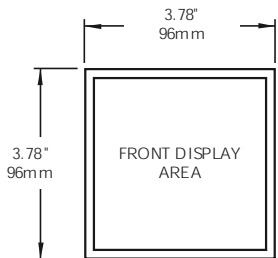


Import and Export Connections

The connection diagrams shown assume an import power configuration, therefore any power flow towards the load will register as importing energy.

If power flows away from the load in an export power situation, this power will register as exporting energy.

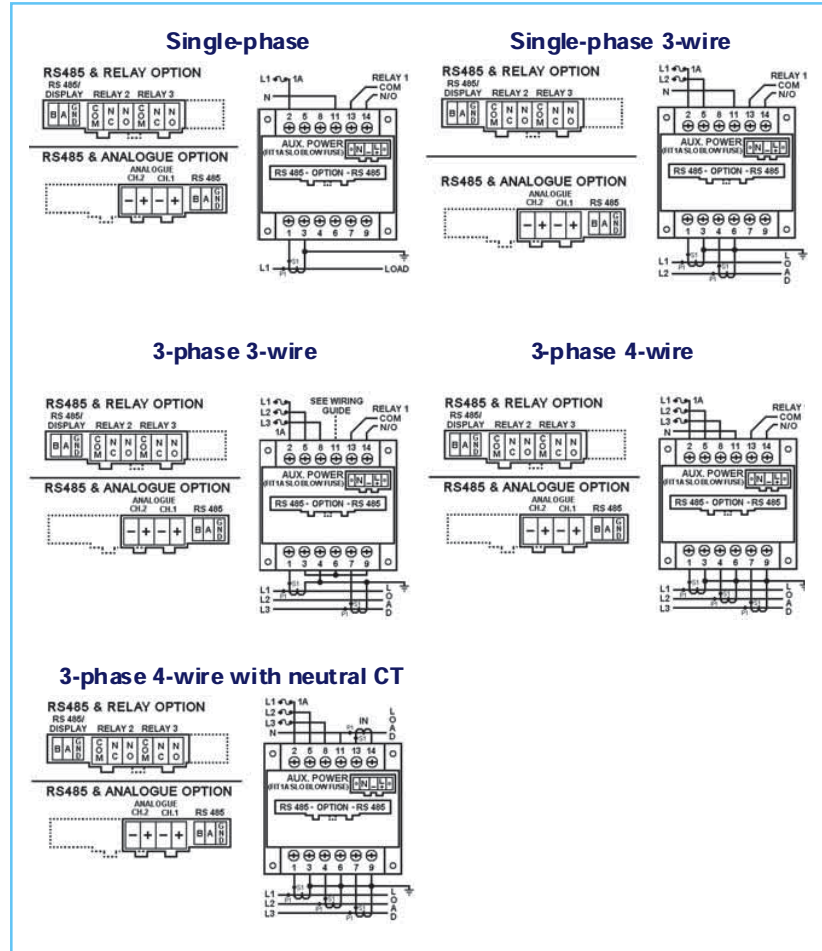
Dimensions



MAX PANEL THICKNESS 0.19", 5mm

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 auxiliary power, 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. Digital interface connections are also via screw-clamp connection, wire protection leaves and sized to accept one #15 AWG (1.5mm²) solid or stranded wire.



Auxiliary Supply

The Integra 1530 should ideally be powered from a dedicated supply, either 100–250V ac or dc (85–280V ac absolute or 85–312V dc absolute) or 12–48V dc (10.2–60V dc absolute). However the device may be powered from a signal source, provided the source remains within the working range of the chosen auxiliary supply.

Fusing

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

Safety/Ground Connections

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

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