1.9 Set up mode, The top row shows an abbreviation of the parameter being set and the middle row shows the parameter value being set and the bottom row is used for confirmation of the entered parameter value.

In general, the "↑" key changes a parameter value and shows a key confirms a value and moves on to the next screen.

1.10 Start Up Screens

Initially, when power is applied to the Integra, start up screens are shown. The first screen lights all the LED’s and is used as a display LED check. The second screen indicates the firmware version installed in the display unit, which is replaced by the default “System” screen.

The displayed value must be in the range -999 x 1000 to 9999 x 1000. Any parameter value outside this range will cause the display to show four bars in the appropriate line. For example, here is shown on the middle line is over range.

An “Err” represents a transient internal malfunction. If “Err” persists, disconnect the auxiliary supply for 10 seconds.

2.1 Special screens

Set up of the Integra may be carried out by using the display or Integra configurator software. Integra configurator software has it's own on line guide.

If required, set up parameters may be manipulated directly via the display, however please refer to the section for the Display screens.

Password protection is not normally enabled when a product is shipped. The unit is protected if the password is set to any four digit number other than 0000. Setting a password of 0000 disables the password protection.

On completion of the last Set-up screen, the program exits Set-up mode and returns to the last selected Display screen. To return to the Display screen at any time during the set up procedures, press the “↑” key and then press the “↓” key.

3.1 Number Entry Procedure

When setting up the unit, many screens require the setting up of a number, usually on the middle row of digits. For example, on the following section, a password may be required. The procedure is as follows:

In general, press the "↑" (adjutant) key to change the digit or digits displayed in the current screen. Pressing the “↑” key will increase the digit and if the maximum digit is reached the next digit will be incremented also. The "↑" key will only change the current screen unchanged and brings up the next screen. The digits are set at one time, from left to right. The decimal point to the right of the digit (in the picture) flashes to indicate the digit that may be changed currently. If true acts as a cursor. Where the cursor coincides with a genuine decimal point on the display, the decimal point will flash.

The following example shows how the number 0000 can be changed to 1234.

First digit

Press the "↑" key to scroll the value of the first digit from 0 through to 9, the value will wrap from 0 to 9. For this example, set it to 1. Press the "↓" key to confirm the setting and advance to the next digit.

On some screens, the digit range may be restricted to prevent out of range entries.

Use the "↑" key to set the second digit to the required value.

Press the "↓" key to confirm the selection. If the unit accepts the entry, the confirmation screen will appear.

If the displayed number is incorrect, press the "↓" key to return to the next set-up screen. If not, press the "↑" key to move to the next set-up screen.

Press the "↑" key to return to the last set-up screen. If the password is set to any four digit number other than 0000, setting a password of 0000 disables the password protection.

On setting up the Integra, the password can be changed. The procedure is as follows:

Set up the new password on the bottom line, as described in Section 3.1, Number Entry Procedure. On pressing "↑" to confirm the new password, the Confirm screen will appear.

Password Change

Press "↑" to start changing the password. The password screen for the first digit will appear with the old password on the bottom line.

Press "↓" to change the password. The screen for the first digit will appear. The first digit will appear.

Press "↑" to confirm the new password. The first Set-up screen will appear.

Press "↓" to confirm the new password. The first Set-up screen will appear.

Password Confirmation

Press "↑" to confirm the new password. The Confirm screen will appear. Password confirmation screen will appear.

Password Rejected

Press "↑" to proceed to the first Set-up screen.

Press "↓" to the Password Confirmation screen. The 0000 password confirmation screen will appear.

Password Change

Press "↑" to confirm the new password. The Confirm screen will appear. Password confirmation screen will appear.

Password Rejected

Press "↑" to confirm the new password. The first Set-up screen will appear.

Press "↓" to confirm the new password. The first Set-up screen will appear.

Password Confirmation

Press "↑" to confirm the new password. The Confirm screen will appear. Password confirmation screen will appear.

Password Rejected

Press "↑" to confirm the new password. The first Set-up screen will appear.

Press "↓" to confirm the new password. The first Set-up screen will appear.

Password Confirmation

Press "↑" to confirm the new password. The Confirm screen will appear. Password confirmation screen will appear.

Password Rejected

Press "↑" to confirm the new password. The first Set-up screen will appear.
3.5 Secondary Voltage and Maximum Power

The INTEGRA 1630 allows the user to specify, within a range, the primary and secondary values of the voltage transformer on which it is to be used. In this document the term Potential Transformer refers to the voltage transformer which is being used.

The INTEGRA 1630 is limited to a maximum of 360 MW. During setup, primary and voltage current settings are checked and the user is alerted if they are not acceptable. If the user accepts these settings the INTEGRA will display invalid and the primary display will be dimmed. The INTEGRA will not perform any calculations or integrate power for the voltage transformer. The INTEGRA display will not show metered values and settings must be corrected. Non-conformant settings will only be accepted if normal configuration settings and the FSC, PT and pulse rate divisor settings during changeover are the same.

The THD calculation is based on the assumption that the inductor and transformer power ratings refer to 120% of nominal current and 120% of nominal voltage, at 50 Hz.

4.2 Set up screen sequence

This screen is used to set the wiring configuration. Unless it is desired to change the wiring configuration, press the key => to move to the next screen.

Press the key to change the system configuration. Use the key to scroll through the available values. Select the value required and press => to confirm the selection.

The INTEGRA 1630 should now restart. If a change to the wiring configuration is made. After a restart wait for about 5 seconds until the normal display screen is shown and then select the required settings.

4.3 DiSP

This screen allows the selection of the frequency. The current display configuration will be used for any new display configuration that is set up.

If the PT primary and secondary values are changed and it is desired to revert to a set-up with a PT, then set both PT primary and secondary values to the nominal voltage and current for the INTEGRA 1630.

5.5 Measurement resolution

Current measurement resolution is 0.24% of full scale current. Voltage measurement resolution is 0.05% of full scale voltage. The INTEGRA uses a sliding window algorithm to simulate the characteristics of a thermal MDI instrument, with the demand period being updated every minute. Demand Integration Times can be set to 8, 15, 20, 30 or 60 minutes. After the Integra has calculated the demand, it will then be reset to zero for the next demand period.

6. Maintenance

Warning

During normal operation, voltages hazardous to life may be present at the terminals of this unit. Installation and servicing should be performed only by qualified, properly trained personnel familiar with local circuit board. Ensure all supplies are de-energized before attempting connection or other procedures. The INTEGRA 1630 should not be used after installation or external installation must be subjected to prevent hazardous voltages or currents.

This unit is not intended to function as part of a system providing the sole means of fault protection to protect life hazards under fault conditions. This unit is not intended to function as part of a system providing the sole means of fault protection to protect life hazards under fault conditions. This unit is not intended to function as part of a system providing the sole means of fault protection to protect life hazards under fault conditions.

6.1 Checks and Cleaning

The front of the case should be gently wiped with a dry cloth only. Do not apply any pressure over the central rectangular window as this may cause damage to the display or the encasing frame. If the display is dirty, use a soft cloth with a dry cloth. If a cleaning agent is necessary, isopropyl alcohol is the only recommended agent and should be used sparingly. Water should not be used. If the rear case or external screen is dirty, a damp cloth with a soft cloth should be used. The front display window also acts as an insulating barrier. It is recommended that the unit be returned to the factory or nearest service centre if a cleaning agent is necessary. Isopropyl alcohol or water may be used in small quantities on the display or where a Modbus communications option is available.

If the PT primary and secondary values are changed and it is desired to revert to a set-up with a PT, then set both PT primary and secondary values to the nominal voltage and current for the INTEGRA 1630.
Tyco Electronics

Integra 1630

Installation guide and Specification

Tyco Electronics UK Ltd, Freebournes Road
Witham, Essex, CM8 3AH, England
Tel: +44 (0) 870 870 7500
Fax: +44 (0) 870 240 5287
E-Mail: crompton.info@tycoelectronics.com

There are two auxiliary supply alternatives available as factory build options. The auxiliary supply is marked on the rear label. The Integra should ideally be connected to the dedicated supply as this will prevent any interference. However when the 100-250V auxiliary option is fitted it may be powered from the same supply, providing the total voltage remains within the medium voltage auxiliary range. The auxiliary supply connection has terminals for both medium voltage and low voltage auxiliary. Depending on the supply option fitted the 124V or the 100-250V will be operational. For 100-250V auxiliary, connect the supply to the outer two terminals marked 13 and 14. For 124V auxiliary, connect to centre and right hand (as viewed from instrument rear) terminals marked –(11) and + (14). Polarity reversal will not cause damage but the instrument will not function.

It is recommended that if used with a remote Integra display, a common auxiliary supply is used for both the display and Integra. If this arrangement is not implemented then the Integra communications parameters may be configured as detailed in the Operation and Setup guide section. The Integra establishes contact with a remote display in the first 5 seconds after power up, and may not operate correctly with the display if the display is powered several seconds after the Integra is powered, unless the communications parameters are set appropriately.

8.2 Output Connections

8.2.1 Ethernet

The INTEGRA 1630 Ethernet option module supports 10/100Base-T Ethernet communication. Connection is via an RJ45 connector to give a low impedance signal decoupling earth connection, if required by the Profibus network.

The slide switch on top of the unit allows serial communications to be switched to the Modbus port for setup purposes, if desired. Only one communications port (i.e. Modbus or Profibus) can be active at any one time.

8.2.2 Profibus connections (marking connections as above)

The recommended cable between the RJ45 master or display and Integra is two core screened cable. Preferably select a cable specifically recommended for RJ45 use (example Belden 9850, 9871) although for shorter distances of a few metres most two core screened cables will usually be satisfactory. As a remote device to Integra communication use RJ45, cable length (transmission distance) will not affect good conditions. Electrical interference or other adverse conditions may reduce the maximum cable length possible for reliable operation.

8.2.3 3-PHASE - 3 WIRE UNBALANCED LOAD

The slide switch on top of the unit allows serial communications to be switched to the Modbus port for setup purposes, if desired. Only one communications port (i.e. Modbus or Profibus) can be active at any one time.

8.3.3 Metered Supply Connection Diagrams

Connection diagrams for medium energy import – for export applications reverse CT (phasing).

3-PHASE - 4 WIRE UNBALANCED LOAD

3-PHASE - 3 WIRE BALANCED LOAD

Profibus Connectors

Tyco is a trademark. CRIMTRON is a trademark of Conextrol Ltd. and is used by Tyco Electronics under licence.

Date: Jun-09
Reference: INT-1630-INSTAL-OP Iss 6.doc

All of the above information, including drawings, illustrations and graphic design, reflects our present understanding and is to the best of our knowledge and belief correct and reliable. Users, however, should independently evaluate the suitability of each product for the desired application. Under no circumstances, therefore, does this constitute as assurance of any particular quality or performance. As such assurance is only provided in the context of our product specifications or express contractual arrangements. Our liability for these products is both in our standard terms and conditions of sale.

Page 1 of 1
9 Specification

9.1 Inputs

<table>
<thead>
<tr>
<th>Nominal rated input voltage</th>
<th>Voltage range L</th>
<th>Voltage range M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single phase two wire</td>
<td>241 - 480V L-N</td>
<td>241 - 480V L-N</td>
</tr>
<tr>
<td>Three phase three wire</td>
<td>241 - 480V L-L</td>
<td>241 - 480V L-L</td>
</tr>
<tr>
<td>Three phase four wire</td>
<td>241 - 480V L-L</td>
<td>241 - 480V L-L</td>
</tr>
</tbody>
</table>

Voltages above are expressed as RMS values and relate to sinusoidal waveforms and corresponding instantaneous peak values. "Range Maximum" for a particular instrument refers to the upper end of the relevant voltage range.

Max continuous input voltage 120% of range maximum.
Max short duration input voltage 2% range maximum (1s application repeated 10 times at 10s intervals).
Nominal input voltage burden 0.2V/A approx. per phase.
Nominal input current 1 or 5A a.c. rms.
System CT primary values
System VT ratios
Any voltage up to 900VA subject to an overall power limit of 250 MW 3600VA nominal and the 4 significant digits limitation of the display unit, which is used for setup
Max continuous input current 120% of nominal.
Max short duration current input 20% nominal (1s application repeated 5 times at 5 min intervals).
Nominal input current burden 0.8A approx. per phase.

9.2 Auxiliary

Standard supply voltage 100 - 260V AC nominal ±15% (85 - 287V AC absolute limits) or 100V to 250V DC nominal ±25% -15% (85 - 312 DC absolute limits).
Optional auxiliary d.c. supply 12 - 48V DC nominal ±15%, -15% (10 - 60V DC absolute limits)
Supply burden 2W / 6 VA (AC or DC supply).

9.3 Measuring Ranges

Values of measured quantities for which accuracy is defined.
Voltage 80 - 120% of nominal (any voltage within the specified range - eg 46.6V to 166.8V L-N 4-wire L range)
Current 5 - 120% of nominal.
Frequency 45 - 66 Hz
Active power (Watt) 5 - 120% of nominal; bi-directional, 360 MW Max.
Reactive power (var) 5 - 120% of nominal; bi-directional, 360 MVar Max.
Apparent power (VA) 5 - 120% of nominal; 360 MVA Max.
Power Factor 0.8 lagging ... 0.8 leading.
Total Harmonic Distortion Up to 31st Harmonic 0-40%, with typical harmonic content distribution, defined to be less than 15% of fundamental amplitude in harmonics content above 15th
Voltage and current ranges assume that crest values are less than 1.25% of rms nominal.

Accuracy
Voltage 0.1% of Range Maximum.
Current 0.17% of nominal.
Neutral current (calculated) 0.8% of nominal.
Frequency 0.15% of mid frequency.
Power factor 1% of Unity (0.01)
Active power (W) ±0.2% of Range Maximum.
Reactive power (var) ±0.5% of Range Maximum.
Apparent power (VA) ±0.3% of Range Maximum.
Active energy (WH) 0.3% of Range Maximum* Exceeds class 1 CEI61036 Sect 4.6
Reactive energy (varh) 0.6% of Range Maximum*.
Total Harmonic Distortion 1% up to 31st harmonic.
Temperature coefficient ±0.01%/°C V,I typical
+0.01%/°C W typical.
Response time to step input
5 seconds plus Modbus response time (to within twice accuracy specification of final value), at 50Hz - 60Hz response time is faster. This parameter is measured via the Modbus port).

*In error in energy readings is expressed as a percentage of the energy count that would result from applying range maximum voltage and nominal current for the same measurement period.
Error change due to variation of an influence quantity (except temperature) by varying one influence quantity within range of use, whilst keeping all other influence quantities at their nominal value is less than twice the error allowed for the reference condition applied in the test. (This definition is applied to limit the number of combinations to be applied during type tests)
Error due to temperature variation is as above.
Error due to temperature variation is as above.
Error in measurement when a measurand is within its measuring range, but outside its reference range is less than twice the error allowed at the end of the reference range adjacent to the section of the measuring range where the measurand is currently operating / being tested.

9.5 Reference conditions of influence quantities

Influence quantities are variables which affect measurement errors to a minor degree. Accuracy is verified under nominal value (within the specified tolerance) of these conditions.
Ambient temperature 23±1°C
Input frequency 50 or 60 Hz ±2%
Input waveform Sinusoidal (distortion factor < 0.006).
Auxiliary supply voltage Nominal ±1%
Auxiliary supply frequency Nominal ±1%
Auxiliary supply (if AC) waveform Sinusoidal (distortion factor < 0.05)
Magnetic field of external origin Terrestrial flux

9.6 Range of Use

Values of measured quantities, components of measured quantities, and quantities which affect measurement errors to some degree, for which the product gives meaningful readings.
Voltage 5 ...120% of Range Maximum (below 5% of Range Maximum voltage, current indication may be only approximately.)
Current 0.1 ... 120% of nominal.
Frequency 45 ... 66 Hz
Power Factor 0 ... 1 leading or lagging
Active power (Watt) 1 ... 144% of nominal, 3600MW Max.
Reactive power (var) 1 ... 144% of nominal, 3600MVar Max.
Apparent power (VA) 1 ... 144% of nominal, 3600MVA Max.
Harmonic distortion (voltage) Max 40% THD (current THD 0-100%)
Power is only registered when voltage and current are within their respective range of use.
Power Factor is only indicated when the measured VA is over 3% of Range Maximum.
Voltage THD is only indicated when the measured voltage is over 5% of Range Maximum, and full accuracy only when measured voltage is over 25% of Range Maximum.
Current THD is only registered when the measured current is over 5% of nominal, and full accuracy only when measured current is over 20% of nominal.

9.7 Standards

EMC Emissions

EN61326 – Emission class A (Industrial)

EMC Immunity


Safety

Condition THD the current THD of the power supply. Max 40% THD (current THD 0-100%)

9.8 Insulation

CT primary to voltage circuits 2.2kV rms 50Hz for 1 minute
 Relay “contact” to voltage circuits 2.2kV rms 50Hz for 1 minute
RS485 to voltage circuits 3.1kV DC for 1 minute
Auxiliary supply to voltage circuits 5kV AC for 1 minute
CT primary to CT primary 5kV AC for 1 minute

CT circuits are galvanically isolated from each other, resistance typically in excess of 1000 ohms tested with a nominal voltage of 100VDC.

9.9 Environmental

Operating temperature -20 to +60°C *
Storage temperature -30 to +80°C *
Relative humidity 0 ... 95% non condensing
Warm up time 30 minutes
Shock 30g in 3 planes
Vibration 10 ... 180 Hz, 1.5mm amplitude peak to peak, 18Hz to 150 Hz @ 1g

* Maximum operating and storage temperatures are in the context of typical daily and seasonal variation.

This product is not designed for permanent operation or long term storage at maximum specified temperatures.

9.10 Enclosure

Sealing IP 54, front face only, when used with panel gasket.
Mounting DIN 96 panel mounting, plastic moulded case. Optional front of panel collar to reduce depth behind panel.

9.11 Ethernet Option

The INTEGRA 1630 Ethernet option is suitable for connection to SCADA systems using the MODBUS®RTU or BACnet IP protocol, the Integra 1630 communications guide includes more details.

The Ethernet port supports 10/100Mb/s in accordance with IEEE802.3u via an RJ45 socket.

9.12 Serial Communications Option

Protocol Modbus DP, Modbus (RS485) or Johnson Controls N2 Var A 1906 38400, 19200, 9600 or 4800 (programmable)
Modbus Parity None, Odd or Even, with 1 stop bit.
None with 1 or 2 stop bits.
(Note Johnson Controls N2 specifies fixed baud rate and parity)
Programmable Modbus word order at user option.

Date: Jun-09
Reference: INT-1630-INSTALL-OP Iss 6.doc

All of the above information, including drawings, illustrations and graphic design, reflects our present understanding and to the best of our knowledge and belief correct and reliable. Users, however, should independently evaluate the suitability of each product for the desired application. Under no circumstances, does this constitute an assurance of any particular quality or performance. Such an assurance is only provided in the context of our product specifications or express contractual arrangements. Our liability for these products is set forth in our standard terms and conditions of sale.