Remote Panel
User Guide
Installation and Operating Instructions

Declaration

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation, or adjustment of the optional operating parameters of the drive or from mismatching of the drive to the motor.

The contents of this User Guide are believed to be correct at the time of printing. In the interests of a commitment to a policy of continuous improvement, the manufacturer reserves the right to change the specification of the product or its performance or the contents of the User Guide without notice.

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Safety Notices

WARNING is given where there is a hazard that could lead to injury or death of personnel.

CAUTION is given where there is a hazard that could lead to damage to equipment.

Safety

The REMOTE PANEL is designed to be used in conjunction with the EC Titanium™ variable speed drive. It is intended for professional incorporation into complete equipment or systems.

The EC Titanium must be installed correctly to prevent a safety hazard. The EC Titanium uses high voltages and currents, carries a high level of stored electrical energy, and is used to control mechanical plant that may cause injury. Close attention is required to system design and electrical installation to avoid hazards in either normal operation or in the event of equipment malfunction.

System design, installation, commissioning and maintenance must be carried out only by personnel who have the necessary training and experience. They must read carefully this safety information and the instructions in this and the EC Titanium user Guides and follow all information regarding transport, storage, installation and use, including the specified environmental limitations.

Please read the IMPORTANT SAFETY INFORMATION below, and all Warning and Caution boxes elsewhere.

Important Safety Information

Safety of machinery, and safety-critical applications

The level of integrity offered by the REMOTE PANEL/ EC Titanium control functions – for example stop/start, forward/ reverse and maximum speed, is not sufficient for use in safety-critical applications without independent means of protection. All applications where malfunction could cause injury or loss of life must be subject to a risk assessment and further protection provided where needed.

Within the European Union, all machinery in which this product is used must comply with Directive 89/392/EEC, Safety of Machinery. In particular, the electrical equipment should comply with EN60204-1.

Conformity with Standards for EC Titanium

- CE-marked for Low Voltage Directive.
- EN61000-4 EMC Generic Emissions Standard, Industrial Level.
- EN61000-2 EMC Generic Immunity Standard, Industrial Level.
- Enclosure ingress protection, EN60529, NEMA 250.
- Flammability rating according to UL 94.

General Specification

Compatible Drives:	EC Titanium	
Signal Interface:	Standard 6-way RJ45 connector	
Supply Input:	10V … 36V DC, 30mA	
RS485 signal:	industry standard 2-wire +5V differential	
Environmental:	Operational	0 … 50 °C
	Storage	-40 °C … 60 °C
	Relative Humidity	< 95% (noncondensing)
Protection rating:	IP54	
Max cable length:	20m (unscreened, total length) 100m (screened, twisted pair, total length)	

Dimension
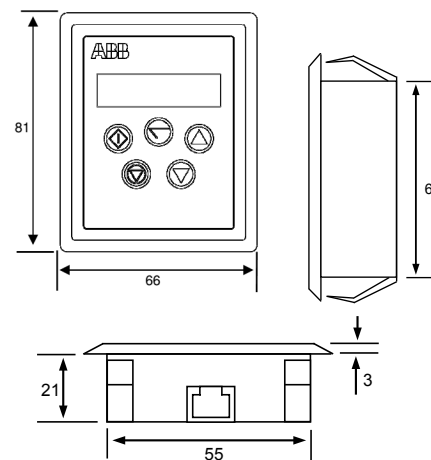
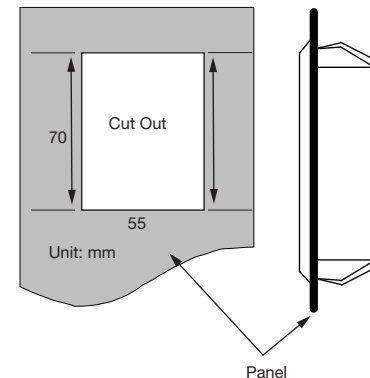## Mechanical Installation

WARNING:
- **When installing the REMOTE PANEL, all EC Titanium drives should be disconnected and ISOLATED before attempting any work. High voltages are present at the terminals and within the drive for up to 10 minutes after disconnection of the electrical supply. The EC Titanium should be installed by qualified electrical persons and in accordance with local and national regulations and codes of practice.**
- **Refer to EC Titanium manual for further details.**

CAUTION:
- **Carefully inspect the REMOTE PANEL before installation to ensure it is undamaged.**
- **Store the REMOTE PANEL in its box until required. Storage should be clean and dry. Temperature range -40oC to +60oC.**
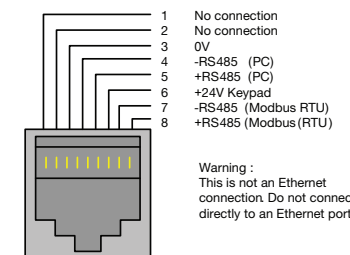
Through Panel Mount

The panel on to which the REMOTE PANEL is to be mounted should be cut out in accordance with the diagram below.

Electrical Installation

Electrical Interface

The REMOTE PANEL uses a standard RJ45 6-Way connector as its electrical interface, which provides a simple solution for the user to setup their system using a standard RJ45 6-Way data cable. The signal layout of the connector is as follows:

1	No connection
2	No connection
3	0V
4	-RS485 (PC)
5	+RS485 (PC)
6	+24V Keypad
7	-RS485 (Modbus RTU)
8	+RS485 (Modbus RTU)

Warning : This is not an Ethernet connection. Do not connect directly to an Ethernet port

Cable Requirements

If the data cable is made up on site, ensure that the connection pin out is correct: Pin 1 to Pin 1, Pin 6 to Pin 6 etc.

CAUTION: Incorrect cable connection may damage the drive. Extra care should be taken when using third party cable.

System Setup

The EC Titanium provides the power supply to the REMOTE PANEL via the RJ45 connection. Once the physical connection has been setup, the system is ready to operate. See picture blow:
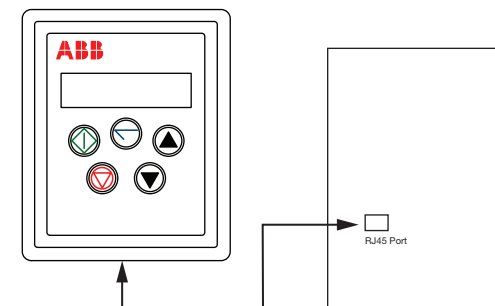
Electromagnetic Compatibility (EMC)

The EC Titanium is designed to high standards of EMC. EMC data is provided in a separate EMC Data Sheet, available on request. Under extreme conditions, the product might cause or suffer disturbance due to electromagnetic interaction with other equipment. It is the responsibility of the installer to ensure that the equipment or system into which the product is incorporated complies with the EMC legislation of the country of use. Within the European Union, equipment into which this product is incorporated must comply with 89/336/EEC, Electromagnetic Compatibility.

When installed as recommended in this User Guide, the radiated emissions levels of all EC Titanium 's are less than those defined in the Generic radiated emissions standard EN61000-6-4. The conducted emission levels are less than those defined in the Generic radiated emissions standard EN61000-6-4 (class A) for the specified motor cable lengths.

User Interface

|			
	NAVIGATE	Used to display real-time information, to access and exit parameter edit mode and to store parameter changes.	
△	UP	Used to increase speed in real-time mode or to increase parameter values in parameter edit mode.	
▽	DOWN	Used to decrease speed in real-time mode or to decrease parameter values in parameter edit mode.	
	STOP	When drive is in trip mode, this button is used to reset a tripped drive. In normal application, when in Keypad mode, this button is used to stop a running drive.	
	START	When in keypad mode, the button is used to start a stopped drive or to reverse the direction of rotation if bi-directional keypad mode is enabled (See drive user guide for more information).	

System Set-up

Depending on the requirement of the application, the REMOTE PANEL can be used in the following four different ways:

(1) Remote Panel & (1) EC Titanium ™

(1) or (2) Remote Panels & up to (63) EC Titanium ™
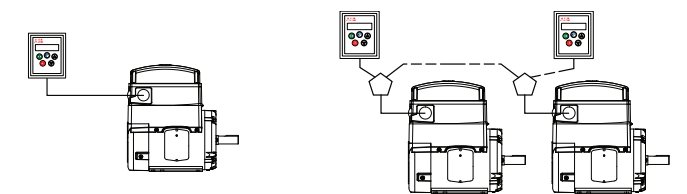
(2) Remote Panels & (1) (1) EC Titanium ™
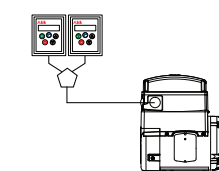
Different drive models can be used on the same Remote Panel network providing a unique communications address is assigned to each. The Remote Panel uses a standard RJ45 6-Way connector as its electrical interface. A standard RJ45 Splitter can be used between the Keypad and multiple drives.

Easy Start Up

To setup the communication address

On first power up, the REMOTE PANEL will communicate with network drive address 1 and initially display "SCAN.." indicating the REMOTE PANEL is searching for a drive with network address 1.

"Load.." is displayed indicating the keypad is reading configuration information from the drive. After 1~2 seconds, data has been loaded and the REMOTE PANEL will display real time drive status.

If the display shows "Adr-01", the keypad didn't find a drive with address 1 in the network. Use the UP and DOWN buttons to select the correct address from 1 to 63. Once the address has been changed to a correct value, press STOP to initiate search again.

Connection to a network of multiple drives

Selection of the drive address can be changed at any time. Press STOP and DOWN buttons together and message "Adr-XX" is displayed. Use UP or DOWN buttons to select the desired drive address. Select the new address and press STOP and DOWN button together to establish communications with the new drive address.

To set up the REMOTE PANEL device number

A maximum of (2) REMOTE PANELs can be used on the same drive network. To use (2) keypads on one drive, change the Device Number on the second panel from the default value of 1 for correct operation. To change Device Number, press NAVIGATE, STOP and DOWN buttons together. "Port-X" (x = 1 or 2) will be displayed. Use UP or DOWN and change the Device Number to 1 or 2 as required. Press NAVIGATE, STOP and DOWN button together again to return to normal operation.

NOTE: An REMOTE PANEL with Device Number 1 must always be present for the network to function correctly. Change the Device Address to 2 only if multiple keypads are connected.

Real Time Operation

Once the communication has been established between the EC Titanium™ and REMOTE PANEL, the user can control the EC Titanium™ by using the control buttons on the front panel of the REMOTE PANEL.

To vary the speed in real time keypad control mode

Note : A Run command must also be present at the drive terminals (e.g. Link T1 to T2)

Key	Function	Description
(green)	START	Drive will ramp up to the preset speed set in the digital potentiometer (assuming parameter 1100 = 1)
(up)	UP	Press the UP button to increase speed. The drive will run forward, increasing speed until the UP button is released. The maximum speed is the speed set in parameter 2008.
(down)	DOWN	Press DOWN to decrease speed. The drive will decrease speed until the STOP button is released. The minimum speed is the speed set in parameter 2007.
(red)	STOP	Press the STOP to stop the drive. The drive will decelerate to stop at the selected deceleration ramp. The display will finally show "StoP" at which point the drive is disabled.
(green)	START	Pressing the START key once more results in the drive running back up to the speed at which it was previously running (assuming 1100 =1)

Pre-setting target speed in keypad mode

Set parameter **1100** = 1 or 3 enables drive start from keypad reference speed. Set Parameter **1103** = 1 for forward direction only and = 2 for forward and reverse rotation.
While in stop, press the **STOP** key and the target speed is displayed (digital potentiometer). Use **UP** & **DOWN** keys to select target speed. Press **STOP** key to return to real time display "**StoP**" or the **START** key to start the drive ramping up to the target speed.

To reverse direction of rotation with Parameter 1103=2

Press **START** key to ramp up to keypad reference speed set above. Press **UP** or **DOWN** to increase or decrease speed. Press the **START** key again. The motor will reverse its direction of rotation. Press the **STOP** key to decelerate the motor to standstill.

Whenever the drive is started, it will start with a positive speed unless the direction is negated by the digital inputs on the user terminals.
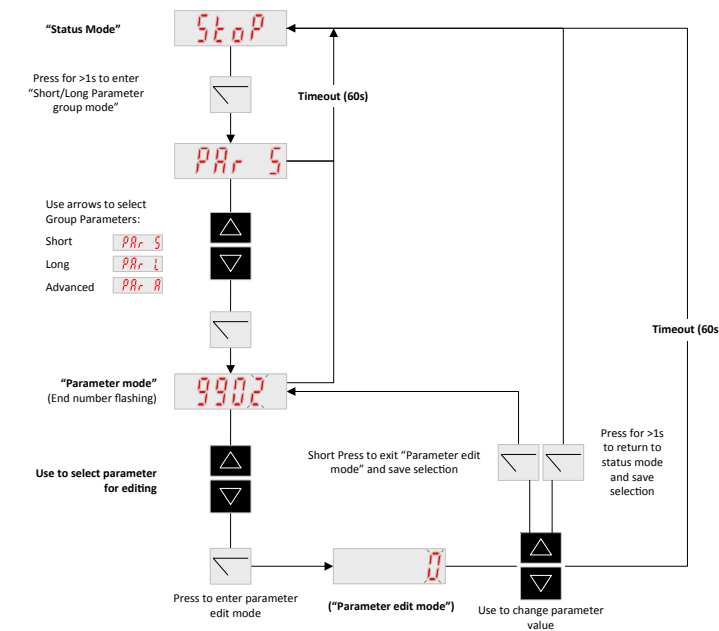
Keypad Display Monitoring

Prior to operation the keypad with show **StoP**, pressing the **StoP** key allows setting the preset speed shown on the display as **H x.x** and while in operation the following displays can be accessed.

Display	Description	
StoP	Drive mains power applied, but no Enable or Run signal applied.	
H 0.0.	Drive running, display shows output frequency (Hz)	While the drive is running, the following displays can be selected by briefly pressing the Navigate button on the keypad. Each press of the button will cycle the display through to the next selection.
A 8.8.	Drive running, display shows motor current (Amps)	
P 0.0.	Drive Running, display shows motor power (kW)	
Stndby	If the enable / disable switch is opened the drive will decelerate to stop at which time the display will show **StoP**. If the potentiometer is turned to zero with the enable /disable closed the display with show H 0.0 (0.0Hz), if left like this for 60 seconds the drive will go into standby mode, display shows **Stndby**, waiting for a speed reference signal	

To monitor or change a parameter value

- Press & hold **NAVIGATE** key > 1s when drive is displaying "**StoP**". Display changes to **Par S**, indicating the short (S) parameter group.
- Use **Up** or **Down** Arrow to select the S, L or A parameter groups.
- Press **NAVIGATE** key while group letter is flashing to enter group.
- Use **Up** or **Down** to change to the desired parameter number.
- To change parameter values, press and hold the navigate key then use the **Up** and **Down** Keys to change to the required value.
- Press and release the **NAVIGATE** key to store the change.
- Press and hold **NAVIGATE** key > 1s to return to real-time mode. Display shows "**StoP**" if stopped or the real-time information (speed, current or power) if the drive is running.

"Status Mode"
StoP

Press for >1s to enter "Short/Long Parameter group mode"   Timeout (60s)

PAr S

Use arrows to select Group Parameters:
Short   PAr S
Long   PAr L
Advanced   PAr A

Timeout (60s)

"Parameter mode"
(End number flashing)
9902

Short Press to exit "Parameter edit mode" and save selection

Press for >1s to return to status mode and save selection

Use to select parameter for editing

Press to enter parameter edit mode   0   ("Parameter edit mode")   Use to change parameter value

Locking access to parameters

Select "Long Parameter mode (Par L) as shown in Real Time Operation.

1. Parameter **1603** sets the chosen parameter access code.
2. Press **Navigate** to exit, **1603** will be hidden and all parameters will be "Read only" (Parameter **1602** remains "Read Write").
3. Access to parameters by REMOTE PANEL is now prevented.

Note: Operational information (e.g. speed, current, power etc) can still be accessed as normal and the drive can still be controlled from the keypad.

Un-Locking access to the parameters

1. Enter in Parameter **1602** the same value as chosen for 1603.
2. To disable locking set parameter **1603** = 0 and then **1602** = 0.

Basic Drive Trip Codes

For a full list of codes and detailed troubleshooting information please refer to the drives user manual.

Message	Explanation
P-dEF	Default parameters have been loaded
F000 1 h 0-1	Over current on drive output to motor
F0009	Drive overload trip
F0004	Hardware Over-current / Internal power stage fault
F0002	Over voltage on DC bus
F0006	Under voltage on DC bus
O-t	Heatsink over temperature
U-t	Under temperature
F000 18	Faulty thermistor on heatsink
F000 14	External trip on digital Input
F000 10	Comms loss trip
F00022	Input phase loss trip
SP in-F	Spin start failed
F0027	Internal memory fault. Parameters not saved, defaults reloaded
F0007	Analog input current out of range
AtF-__	Auto-tune failed error with error code

Understanding the Display Messages

The REMOTE PANEL uses various display messages to indicate different working status. See the following table for more information.

Message	Explanation
SCAN..	The REMOTE PANEL is searching for the drive in the network
LOAD..	The REMOTE PANEL has found the drive in the network and is loading the initialization information from the drive
Err-SC	The REMOTE PANEL has lost the communication link to the drive.
Adr-XX	Indicates the REMOTE PANEL address, where XX= 1...63
Port-X	This message shows the REMOTE PANEL device number X = 1 or 2

Troubleshooting

Message	Explanation
'Adr-XX'	REMOTE PANEL failed to find the drive with the specified address in the network. Check that the RJ45 data cable connection is correct. Check that the drive with address XX is available in the network. If XX >1 and only one REMOTE PANEL is connected, then check the REMOTE PANEL device number, make sure the number is 1.
Display 'Err-id' on power up	This normally occurs when there are two REMOTE PANEL units in the same drive network and both of them have the same device number. Check and change the device number of one REMOTE PANEL.
Display 'Err-id' during normal operation	This normally occurs when the user plugs a second REMOTE PANEL into the drive network. Change the device number of one of the REMOTE PANEL units.
Display 'Err-SC'	Check the electrical connection, and make sure the cable is connected correctly between the REMOTE PANEL and the drive. Press 'STOP' button to enable the REMOTE PANEL to search for the drive again.

8 2 - R E M - P A N - A B M   V 2

* 4 4 9 - 1 8 1 9 *