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TCV-Ethernet Operating Manual

(Product P/N 10469)



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Warnings



There is a high electrical voltage inside the unit that could cause electric shock.



Do not allow any type of liquid to come into contact with any part of the unit.



Immediately discontinue use of the unit if smoke, an abnormal odor, or an unusual sound is emitted by the unit.



Do not fold, bend or apply excessive force to any cables or fittings.

Cautions

- The AC power entry can be configured to accept 110VAC or 220 VAC electric power. Before supplying power to the unit ensure that the voltage selection is correct for the actual power being supplied.
- Avoid installing or storing this unit in a location where it may become wet or dust covered.
- Do not mount or place this unit in an unstable location.
- Dropping this unit may result in personal injury or damage to the unit.

- Turn the unit off and remove electric power plug before performing any maintenance on the unit.
- There are no user serviceable parts inside the main enclosure of the unit.

Introduction

The TCV-Ethernet and SLTC-FM Switch Wrench are an integrated torque control and data management/communications system. The system is designed for high speed, high volume assembly operations using Ethernet communications running the PowerFocus open protocol.

Tool communications are performed using frequencies the 2.4GHz band. Primary upstream communication is via the supplied Ethernet connector; other communications are through an I/O port, RS-232 port, and liquid crystal display.

The TCV-Ethernet is essentially two communications systems working together. The TCV (Torque Control Verifier) function receives and processes communications with the Switch Wrench programmed into the unit as the current working tool. The information gathered by the TCV is communicated to the Ethernet interface, which handles primary upstream communications to the plant floor control system. As fasteners are tightened, they are reported to the TCV by the torque wrench. As events (individual tightenings or batch completions) occur, the Ethernet side of the unit encodes the information using the PowerFocus Open Protocol and transmits it via the Ethernet connection.

We recommend that purchasers and users read this manual thoroughly. If this unit is mishandled, bodily injury or damage to the unit may occur.

This manual is a general guide to the operation of the TCV-Ethernet unit. If any additional questions arise, please contact your sales representative.



1. Case
2. Mounting Flange (left and right sides)
3. Mounting Holes (4 total - 2 per side)
4. Antenna Cover
5. Power LED
6. Accept LED
7. Reject LED
8. Strength/Programming LED
9. 2-Line LCD Screen
10. Ethernet Status Indicators

11. Programming Keypad



Up



Down



Left



Right



Enter

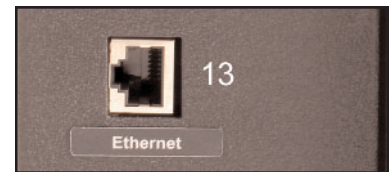


Escape

12. I/O Connector (Relay Connector)



13. Ethernet Connector



14. Keyed Lock
The keyed lock is used to tie a specific torque wrench transmitter to the unit.



15. 9-Pin DSUB Connector



16. Power Entry Module

The Power Entry Module (PEM) performs power management and electrical safety functions.

There are several components to the Power Entry Module. These include a power cord receptacle, a power switch, a fuse holder and a power selector. The current setting for the power selector shows through a window just above the power switch.

See the installation section for critical information prior to installing the unit.



Installation

Considerations

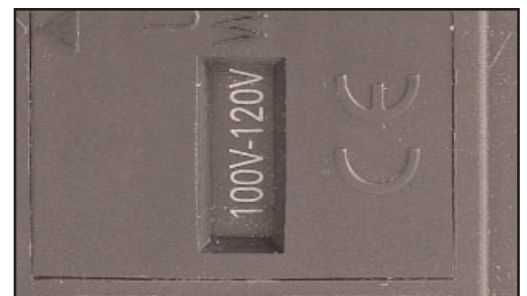
The following factors should be taken into consideration when selecting the installation location:

- The unit must be mounted in a location that is physically stable.
- The location must be such that the unit can be attached to it via fasteners passing through the mounting holes in the case flange.
- The location must protect the unit from contact with water and excessive dust.
- The unit requires electric power of 120VAC or 240 VAC.
- There should be sufficient room on either side of the unit to provide access for connecting communications and maintaining the unit.
- The front of the unit should be readily visible and readily accessible.
- The unit must be mounted within reliable transmission distance from the location where the FM Switch Wrench tied to the unit will be used.

Power Entry Module Voltage Selection

It is imperative that the Power Entry Module be set for the voltage to be used to power the unit **before** electric power is connected to the unit.

The Power Entry Module (PEM) has a window just above the power switch that shows the present setting for the voltage selector. The selector will show either “100V-120V” or “220V-240V” through the window. In the image to the right, the internal voltage selector is set for 120VAC power.

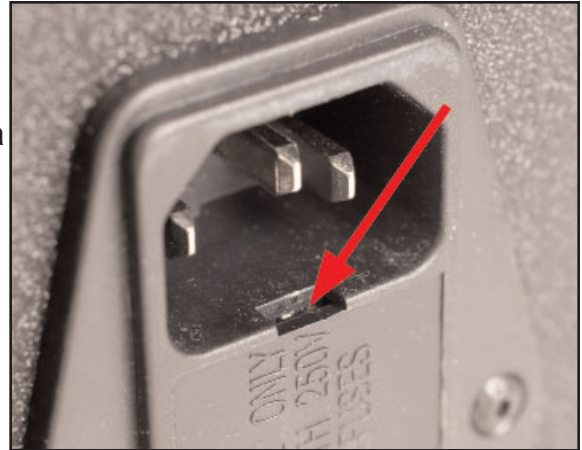


If the voltage selection visible through the window is the voltage that will be used to power the unit, installation can proceed. If the setting does not match the power that will be used, the voltage selector must be changed to the correct, matching setting.

To change the voltage selection:

1. Make certain that the power cord is disconnected from the receptacle on the unit.
2. Set the unit on a flat work surface.
3. The voltage selector is attached to the plastic cover that has the window through which the current voltage selection is displayed. This cover is a “snap-in” or press-fit type; it is pressed into a recess in the PEM. The cover must be removed to access the voltage selector.

To remove the cover, insert a fingernail or small screwdriver into the slot located in the power receptacle behind the tab at the top of the cover and pry outwards gently. See photograph at right.

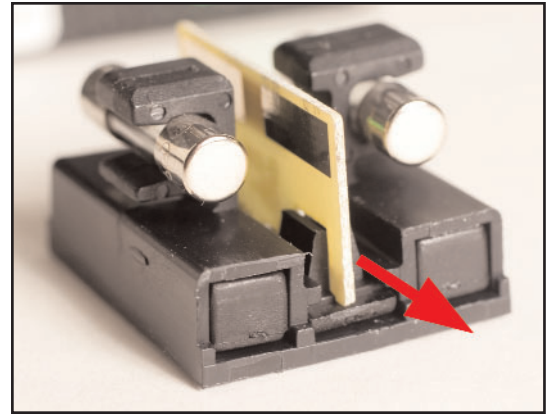


4. The photograph to the right shows the voltage selector holder removed from the PEM. The current setting is for 120VAC, as shown in the holder window.

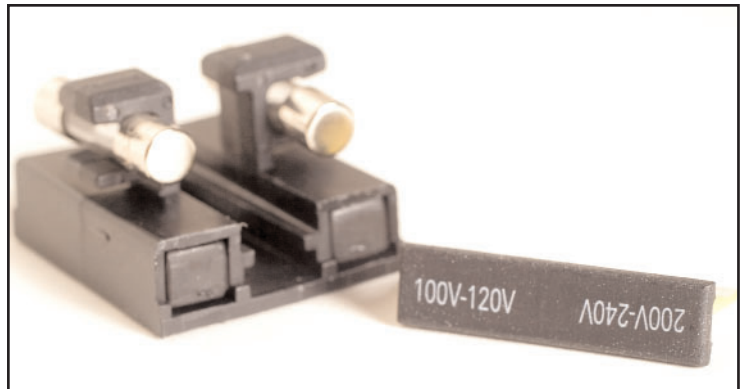
The voltage selector itself is a yellow and black plastic and metal component, one corner of which is visible and highlighted by the red arrow.



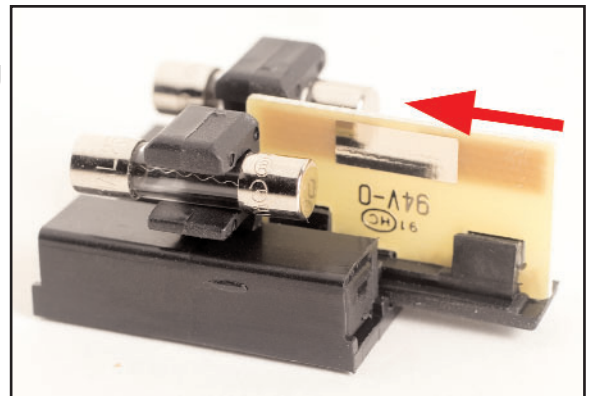
5. The voltage selector fits in a slide in the middle of the holder. To remove the voltage selector from the holder, simply slide it out of the channel in which it fits.



6. When the voltage selector has been removed, tilt it so it is oriented as shown in the image to right. The end that is closest to the holder and has the top of the letters at the top is the voltage for which the unit was set. To change the voltage, reverse the orientation of the selector so the required voltage will be the end that is at the bottom of the slot when the selector is reinserted. This change of orientation establishes the voltage setting change when the selector is reinserted.



7. Reinsert the voltage selector in the holder with the end marked for the required voltage entering the slot first.

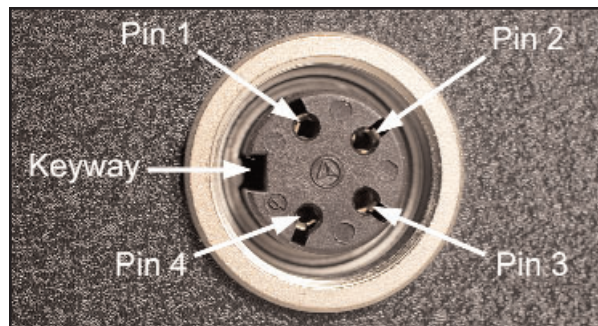


8. Reinsert holder into PEM.
9. Check the voltage selector window to insure that the correct voltage now shows through the window. If the correct voltage is displayed, the process has been properly performed.

Four-Pin I/O Port Connection

This is a four-pin circular connector, Amphenol-Tuchel T3303 000. The relay pin connection configuration is:

Pin 1	Cycle OK
Pin 2	Batch Complete
Pin 3	Cycle Reject
Pin 4	+24VDC



The unit arrives with +24VDC electric power supplied on Pin 4. The system power at Pin 4 is rated at +24VDC and 0.5 Amps. The voltage on Pin 4 will be returned on pins 1 - 3 as the corresponding relays close.

RS-232 Nine-Pin DSUB Connection

This connector is used to communicate with an external computer. There is software available that permits programming the TCV-Ethernet via serial communications through this port.

A null-Modem cable (or convertor and standard cable) is required to connect this port to another device.

For this connector:

Pin 2	- RX
Pin 3	- TX
Pin 5	- GND



The other pins are straight-through connections.

Ethernet Connection (RJ45 - 10BASE - T)

This port is used for connection to the plant floor control ethernet network. This unit will transmit TCP/IP messages based on the PowerFocus Open Protocol directly to the plant floor system each time a fastening is communicated to the unit by the FM Switch Wrench.

Power Connection

Check the voltage selection to assure the voltage setting for the unit is the same as that being supplied. If the two voltages match, connect the power cord to the power receptacle in the Power Entry module.

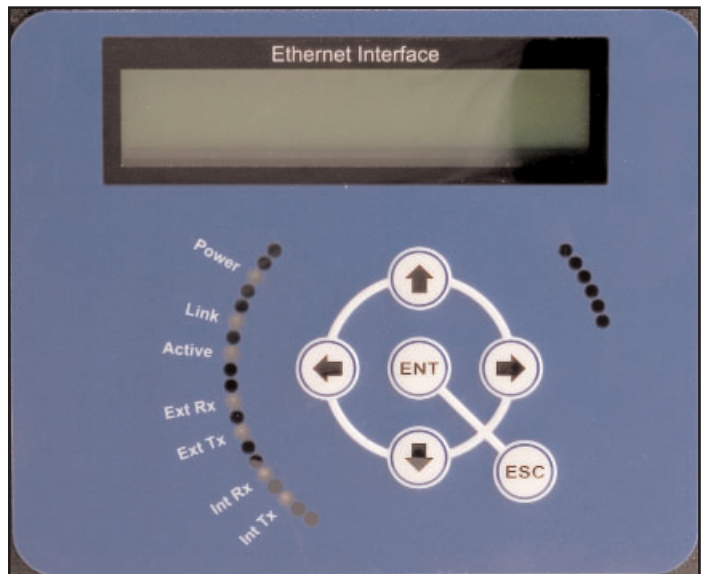
Front Panel Operation and Programming

The front panel provides immediate access to current TCV-side and wrench communications status and access to programming TCV functions and Ethernet communications.

Status checks and programming communications and functions are performed through the front panel display and buttons. The two-line liquid crystal display provides information to the programmer on current status, current menu options, and the options selected.

Menu navigation and function selection is performed using the six buttons provided: Up, Down, Left, Right, Enter, and Escape.

When the unit is turned on (activated), it initially displays the firmware version and TCV status.



Operation Screens

The primary and initial display is of TCV operating status items. These are items outside of the programming function that are pertinent to current tool and TCV operations.

This operating information display level has seven screens. The screens can be scrolled through through use of the Up and Down buttons.

The first operating screen displays the current number of fasteners in a batch and how many fasteners have been correctly tightened with the switch wrench in the current batch.

TCV Status
CNT = 1 BAT = 5

The second screen displays the total number of batches that have been completed with this TCV.

TCV Status
Total = 179

The third screen shows the click duration (cycle time) for the switch wrench in the most recent cycle of the tool.

TCV CLK DURATION
DURATION = 0.18

The fourth screen displays the current approximate battery charge for the battery in the wrench. This is an approximate percentage, not a voltage.

TCV BATTERY LEVEL
LEVEL = 90%

The fifth screen displays a relative signal strength for the radio signal coming from the switch wrench.

TCV SIGNAL STRENGTH
SIGNAL = 64%

The sixth operating screen displays the current IP address programmed into the TCV-Ethernet interface.

UNIT IP ADDRESS
192.168.1.101

The seventh operating screen displays the Client IP Address of the computer that is communicating with this unit.

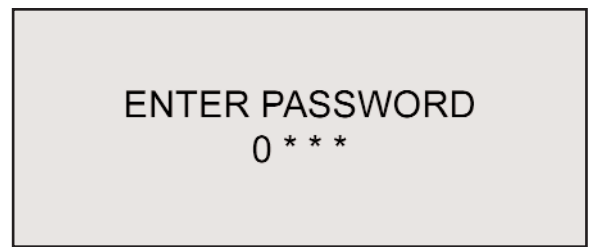
CLIENT IP ADDRESS
192.168.1.101

Programming

To exit the operating functions display and enter the programming mode, press the Enter Key.



A password is required to enter the programming functions for the unit. The “Enter Password” window will be displayed once the Enter button has been pressed. The default password is “0104”.



The key conventions when entering the password are:

- The left and right arrow buttons move the cursor and currently active digit selection among the positions.
- The up and down arrow buttons raise and lower the value of the digit that the cursor is highlighting.
- The Escape button will stop the process of accessing the programming menu and return to the operating screens.
- The Enter button causes the unit to compare the current password selection to the password in memory. If the correct password has been selected, access to the programming menu is granted.

Once the password is accepted, the first item on the program menu is displayed. There are 13 program items for the TCV functions and 15 program items for the Ethernet and miscellaneous functions. Each item has an entry screen and at least one screen for programming the item.

The program menu navigation conventions are:

- The Up and Down buttons scroll through the menu items in sequence.
- The Enter button opens the current item and presents the screens for editing.
- The Escape button exits an item without changing or saving the value.
- After the item is edited, the Enter button saves and exits. There is often a window that displays while the new value is being saved. A second press of Enter is used to finish.

The front panel programmable items for TCV functions are:

TCV Batch Count	TCV/RST Total/Batch
TCV Timer Min	TCV Channel
TCV Timer Max	TCV Add Wrench
Count Direction	TCV Erase Wrench
Time Between Batches	TCV View Wrench ID
Time Between Cycles	Relay Settings
TCV Beep Setting	

The front panel programming items for Ethernet and miscellaneous functions are:

Local IP Address	LCD Contrast
Gateway Address	Change Password

Subnet Mask
Port Number
Message Timeout
Resend Attempts
Keep Alive Timeout
Time and Date

Control Cell ID
Control Channel
Control Name
Serial Printer
Bar Code Reader

The serial printer and bar code reader functions are optional. These devices are not supplied when the system is purchased and must be purchased separately if desired.

Programming the TCV Batch Count

This model of the TCV is capable of performing batch counts for batches of from 1 - 99 fasteners. The batch count controls when the batch relay closes. Batch count data is also available to the plant floor control system through the Ethernet communications.

To select the batch count, press the Enter button when the TCV BATCH COUNT window is displayed.

The the display will show the current batch count. The Up and Down arrow buttons will increment or decrement the value by one fastener each time the button is pressed. To change the count more rapidly, the Left and Right arrow buttons will increment or decrement the batch count by 10 fasteners.

To exit this program item without changing the value, press the Escape button at any time during the process. To save a changed value and make it the active value, press the Enter button after the value has been changed.

PROGRAMMING
TCV Batch Count

BATCH SETTING
Batch = 5

Programming the TCV Timer Min (Minimum)

Two timers control the time limits for an acceptable switch wrench cycle (time in the "clicked" position). The TCV Timer Min controls the minimum time specification limit. TCV Timer Max controls the maximum time specification limit for an acceptable cycle.

To program the TCV Timer Min specification, press the Enter button when the TCV Timer Min window is displayed. The Timer Min window will open. This window will show the current minimum value of the specification. To exit this program menu item at any time, press the Escape button.

PROGRAMMING
TCV Timer Min

To change the specification use the Up and Down buttons. Press the Up button to increase the time in 0.01 second increments. Press the Down button to decrease the time in 0.01 second decrements. The Left and Right buttons will change the time up and down by 0.10 second increments and decrements.

TIMER MIN
Timer = 0.00

The timer can be set for any time between 0.00 and 2.55 seconds, but the TCV Timer Min specification value must be less than the TCV Timer Max specification value.

Press the Enter button to save the new specification value and return to the main programming menu.

TCV Timer Max (Maximum)

TCV Timer Max controls the maximum time specification limit for an acceptable cycle. Two timers control the time limits for an acceptable switch wrench cycle (time in the “clicked” position). The TCV Timer Min controls the minimum time specification limit.

To program the TCV Timer Max specification, press the Enter button when the TCV Timer Max window is displayed. The Timer Max window will open. This window will show the current minimum value of the specification.

PROGRAMMING
TCV Timer Max

To exit this program menu item at any time, press the Escape button.

TIMER MAX
Timer = 0.75

To change the specification use the Up and Down buttons. Press the Up button to increase the time in 0.01 second increments. Press the Down button to decrease the time in 0.01 second decrements. The Left and Right buttons will change the time up and down by 0.10 second increments and decrements.

The timer can be set for any time between 0.00 and 2.55 seconds, but the TCV Timer Max specification value must be greater than the TCV Timer Min specification value.

Press the Enter button to save the new specification value and return to the main programming menu.

Programming the Count Direction

The unit can be programmed to count acceptable cycles in a batch in either the upwards (from 0 to total number in batch) or downwards (total number in batch to 0) direction.

The Count Direction menu item is selectable for change by pressing the Enter button when the Count Direction window is active.

When this menu item is entered a new window will be displayed showing the current direction. To change the direction press any of the arrow buttons (Up, Down, Left, Right) and then press the Enter button to set the change and exit.

To exit without change, press the Escape button.

PROGRAMMING
Count Direction

EDIT GATEWAY
Direction = UP

Programming the Time Between Batches

A timer controls the minimum acceptable elapsed time between batches. This specification is settable through the Time Between Batches menu item.

To change the time, press the Enter button when the Time Between Batches item is active. This will open the item for review or alteration.

The current value for the specification will be displayed when the item is open. The Up and Down buttons increase or decrease the setting value by one second. The Left and Right buttons increase and decrease the setting by 100 seconds with each press of the button. When the desired value is displayed, press the Enter button to set the value and return to the programming menu. To exit this item without changing the value, press the Escape button.

PROGRAMMING
Time Between Batches

Time Between Batches
Timer = 20

Programming the Time Between Cycles

A timer controls the minimum acceptable elapsed time between switch wrench cycles (individual fasteners). This specification is settable through the Time Between Cycles menu item.

To change the time, press the Enter button when the Time Between Cycles item is active. This will open the item for review or alteration.

PROGRAMMING
Time Between Cycles

The current value for the specification will be displayed when the item is open. The Up and Down buttons increase or decrease the setting value by one second. The Left and Right buttons increase and decrease the setting by 100 seconds with each press of the button. When the desired value is displayed, press the Enter button to set the value and return to the programming menu. To exit this item without changing the value, press the Escape button.

Time Between Cycles
Timer = 3

Programming the TCV Beep Setting

The Beeper in the TCV can be programmed to activate under varying conditions. The available options are:

- Off (Never)
- Accept (cycle) and Reject (cycle)
- Batch (completion) and Reject (cycle)
- Reject only

The Beep Setting may be accessed when the item is active in the main programming menu by pressing the Enter button.

The current beeper setting will be displayed. Press any arrow button (UP, Down, Left, Right) to scroll through the available options. When the desired setting is displayed, press the Enter button to activate that setting and exit this item. This item may be exited without change by pressing the Escape button.

PROGRAMMING
TCV Beep Setting

BEEP SETTING
Beep = BATCH & REJ

Programming - Resetting the Total and Batch Counts

The Batch Count and the Total (cycle) Count can both be reset. To reset either or both counts, press the Enter button to access this function.

The display will show the two counts, both on the second line of the new display. To reset the Total Count, press the Up button. To reset the Batch Count press the down button. Press the Enter button to active your selection and return to the main program selections.

Press the Escape button to exit without resetting.

PROGRAMMING
TCV RST Total/Batch

RST TCV TOTAL/BATCH
UP = TTL/DOWN = BATCH

Programming the TCV Channel (RF)

The radios used by the TCV-Ethernet and FM Switch Wrench use the Zigbee Network Protocol. This allows the use of many TCV-Ethernet units and FM Switch Wrenches in close proximity without having to use separate channels. Because an occasion may arise where the user wishes to specify a channel, this ability is provided.

To select a specific channel, press the Enter button when the TCV Channel item is displayed.

The display will then show the current channel. Use the Up and Down buttons to specify the desired channel. To save and activate this setting in the unit, press the Enter button. To leave this menu item without change, press the Escape button.

If a new channel has been selected and activated, the wrench must be reprogrammed (learned) into the unit.

PROGRAMMING
TCV Channel

XBEE CHANNEL SETTING
Channel = 1

Programming - Adding a Wrench (Transmitter)

The TCV-Ethernet and FM Switch Wrench work as a system. To work together, the wrench must have a transceiver on it and the transceiver for that particular wrench must be “learned” (identified and recorded) by the unit.

It is simplest to perform this function by using the key switch on the side of the unit and the procedure described later in this manual. If the key is unavailable this function can be performed through programming.

First, clear the memory on the wrench to be “learned” by putting it in the “clicked” position and holding it in that position for ten (10) seconds or until the LED on the wrench alternates between red and green.

To have the TCV-Ethernet “learn” the new wrench or one with a new transceiver, press the Enter button when the TCV Add Wrench item is active. The display will then offer the option of adding the wrench to the limited set of those it recognizes or not.

Press the Enter button to add the wrench and set it as the tool to communicate with or press the Escape button to exit this program item without changing the wrench to be worked with.

PROGRAMMING
TCV Add Wrench

ADD CURRENT WRENCH
ESC = NO/ENTER = YES

Programming - Erasing a Wrench

The current wrench (transceiver) can be removed from memory through this function. To access this function, press the Enter button when the TCV Erase Wrench item is displayed.

The display will change, providing a choice of erasing the identification number from memory or leaving the current wrench transceiver active. To erase the wrench transceiver from memory and return to the main item sequence, press the Enter button. To exit this function without erasing the wrench from memory, press the Escape button.

PROGRAMMING
TCV Erase Wrench

ERASE CURRENT WRENCH
ESC = NO/ENTER = YES

Programming - Viewing A Wrench (Transceiver) Identification Number

Each wrench transceiver has a unique four-digit identification number. This allows the unit to work with a specific tool when multiple tools are used in close proximity and on the same channel.

The transceiver identification number can be viewed through this function in the programming menu. Press the Enter button when this menu item is active to view the number.

The current identification number will be displayed. Press any front panel programming button to return to the main programming menu.

PROGRAMMING
TCV View Wrench ID

TCV Wrench ID
3602

Programming - Relay Settings

The three relay contacts available on the side of the unit can be programmed to close momentarily or to remain closed (maintained) until another relay even occurs. When set to momentary the contacts are closed for 200ms.

To check or change the relay contact setting, press the Enter button when this item is active. The display will then show the current setting. To keep the current setting, press the Escape button. To change the setting, press any arrow button once, then press the Enter button to save the change and return to the main menu.

PROGRAMMING
Relay Settings

EDIT RETRY LIMIT
Relays = Momentary

Programming Unit IP Address

The TCV-Ethernet acts as a server. For a server client (remote computer) to communicate with the unit, the client must have the internet protocol (IP) address of the unit.

To set the local IP address for the unit, press the Enter button when this menu item is displayed.

The current IP address will then be displayed, with one digit underlined. To move among the address digits, press the Left or Right buttons. To modify the underlined digit, use the Up or Down buttons.

PROGRAMMING
Local IP Address

EDIT IP ADDRESS
192.168.001.068

To save the address after the required digits have been changed to reflect the correct address on the network, press the Enter button. To exit this function at any time without changing the address, press the Escape button.

Programming Gateway Address

Gateways can act as bridges between separate networks. For two devices to communicate between two separate networks the messages must pass through each respective network's gateway.

If the two devices that are communicating are on the same network, the gateway will not be used and the address will not matter.

To edit the Gateway Address, press the Enter button when the function is displayed.

The current Gateway Address will then be displayed, with one digit underlined. To move among the address digits, press the Left or Right buttons. To modify the underlined digit, use the Up or Down buttons.

PROGRAMMING
Gateway Address

EDIT GATEWAY
192.168.001.255

To save the address after the required digits have been changed to reflect the correct Gateway Address, press the Enter button. To exit this function at any time without changing the address, press the Escape button.

Programming the Subnet Mask

The Subnet Mask allows the system to determine which IP addresses are local and which IP addresses are remote.

To edit the Subnet Mask, press the Enter button when this menu item is active.

The current Subnet Mask will then be displayed, with one digit underlined. To move among the address digits, press the Left or Right buttons. To modify the underlined digit, use the Up or Down buttons.

To save the address after the required digits have been changed to reflect the correct Subnet Mask, press the Enter button. To exit this function at any time without changing the address, press the Escape button.

PROGRAMMING
Subnet Mask

EDIT SUBNET MASK
255.255.255.000

Programming Port Number

Different Ethernet services can be represented by different port numbers. The TCV-Ethernet acts as a server and will listen on the programmed port number for an external device to make a connection. A connection will not be established unless the messages are sent over the programmed port number.

PROGRAMMING
Port Number

To edit the Port Number, press the Enter button when the item is active.

The current Port Number will then be displayed, with one digit underlined. To move among the Port Number digits, press the Left or Right buttons. To modify the underlined digit, use the Up or Down buttons.

To save the Port Number after the required digits have been changed to reflect the correct Port Number, press the Enter button. To exit this function at any time without changing the Port Number, press the Escape button.

EDIT LOCAL PORT
04545

Programming Message Timeout

As the client and server send messages to each other the device sending the message waits for a response (acknowledgement of receipt) from the recipient device. If that response is not received within a specified period, the sender may resend the message or close the socket. The message timeout defines the specified period.

PROGRAMMING
Message Timeout

To edit the Message Timeout period, press the Enter button when the item is active.

The current Message Timeout value in seconds will then be displayed. To increment or decrement the values by 1 press the Up or Down buttons. The Left and Right buttons increment and decrement the value by 10 seconds.

To save the Message Timeout value after a change, press the Enter button. To exit this function at any time without changing the Message Timeout value, press the Escape button.

EDIT ACK TIMEOUT
10

Programming Resend Attempts

The Resend Attempts value is the number of times the server will try to resend a message if there is no response from the client. Once the resent attempts value is reached the server will release the socket and wait for a new connection to be made.

To edit the number of Resend Attempts that will be made, press the Enter button when the item is active.

The current number of Resend Attempts will be displayed. To increase or decrease the value, use the Up or Down buttons.

When the desired value is displayed, press the Enter button to save the value and return to the primary menu. The Escape button can be used to exit this function without saving any changes.

PROGRAMMING
Resend Attempts

EDIT RETRY LIMIT
5

Programming Keep Alive Timeout

The client is responsible for sending a “keep alive” message to the server if no other message has been sent in a given amount of time. The Keep Alive Timeout defines how long the server will wait for a standard message or “keep alive” before resetting the socket.

The Keep Alive value can be any time between 30 and 120 seconds. *If a value greater than 119 seconds is selected, the Keep Alive timer is turned off.*

To edit the Keep Alive timer, press the Enter button when the item is active.

PROGRAMMING
Keep Alive Timeout

The Keep Alive value will be displayed. The Up and Down buttons will increment and decrement the value by one second with each press of the button. The left and Right buttons will increment and decrement the value by ten seconds with each press of the button.

To save a changed value and return to the main menu, press the Enter button. To exit the process at any time without saving any changes press the Escape button.

EDIT KEEP ALIVE
30

Programming Time and Date

The TCV-Ethernet has an internal clock that keeps track of the time and date. This clock will continue to operate even if the unit is turned off.

It is important to program the unit with the correct time and date since this information is included with the torque values when the unit is in use. The unit uses military time (24 hour clock) instead of AM and PM. 1:00 PM in civilian time is 13:00 in military time.

To view the current time and date press the Enter button when this function is active. This will cause the current time and date according to the internal clock to be displayed.

If the time and/or date is not accurate, press the Enter button again to activate the editing function. A cursor will appear under the month value in the date. The Left and Right buttons move among the values to be edited. The Up and Down arrows increment and decrement values in the active value.

PROGRAMMING
Time & Date

CURRENT DATE/TIME
4/12/07 14:45:16

EDIT DATE/TIME
4/13/07 14:46:04

Press the Enter button to store the new value and return to the main menu. Press the Escape button to exit this function at any time without storing any changes.

Programming LCD Contrast

The voltage that controls the contrast on the LCD display is adjustable.

To adjust the contrast, press the Enter button when this item is active.

The current value for the contrast will be displayed.

PROGRAMMING
LCD Contrast

use the Up and Down buttons to increase or decrease this value.

To save the new contrast value setting and return to the main menu, press the Enter button. To exit this function without change, press the Escape button.

EDIT CONTRAST
8

Programming a Password Change

All TCV-Ethernet units ship with a default password of "0104". This password may be changed through this menu item. To access this item, press the Enter button when the item is active.

The password will be displayed with the first digit visible and the other three digits represented by asterisks. The Left and Right buttons allow the user to move among the digits for editing. The Up and Down buttons increment and decrement the active digit. Only the active digit will be displayed at any time in the process. The other digits will be shown as asterisks.

PROGRAMMING
Change Password

ENTER NEW PASSWORD
0 * * *

After a change is made, press the Enter button to save the change and return to the main menu. The Escape button may be pressed at any time to return to the menu without activating any change.

Programming Control Cell ID (Identification)

The Control Cell ID is an alphanumeric identifier for the location (manufacturing cell) where the unit is used. This cell identifier is added to every torque record obtained from the unit.

To edit the Control Cell ID, press the Enter button when the item is active.

The display will show an alphanumeric field for entry. The Left and Right buttons move among the characters to provide access for editing. The Up and Down buttons allow editing of the currently active character.

To save an edited identifier and return to the main menu, press the Enter button. To exit this item without saving any changes, press the Escape button.

PROGRAMMING
CONTROL CELL ID

CONTROL CELL ID - ENTER
A CELL ID HERE

Programming Control Channel

The Control Channel is an alphanumeric identifier for the unit. This identifier is added to every torque record obtained from the unit.

To edit the Control Channel, press the Enter button when the item is active.

The display will show an alphanumeric field for entry. The Left and Right buttons move among the characters to provide access for editing. The Up and Down buttons allow editing of the currently active character.

To save an edit and return to the main menu, press the Enter button. To exit this item without saving any changes, press the Escape button.

PROGRAMMING
Control Channel

CONTROL CHANNEL - ENTER
A CONTROL CHANNEL HERE

Programming Control Name

The Control Name is another alphanumeric identifier for the location or application where the unit is used. This name identifier is added to every torque record obtained from the unit.

To edit the Control Name, press the Enter button when the item is active.

The display will show an alphanumeric field for entry. The Left and Right buttons move among the characters to provide access for editing. The Up and Down buttons allow editing of the currently active character.

To save an edited Control Name and return to the main menu, press the Enter button. To exit this item without saving any changes, press the Escape button.

PROGRAMMING
Control Name

CONTROL NAME - ENTER
A CONTROL NAME HERE

Serial Printer Function

A serial printer can be used with the unit by connecting it to the serial port on the side of the unit. The Serial Printer function is used to make this function active if desired.

If the serial print function is to be used, the baud rate that the printer can use must be known and must be one compatible with the TCV-Ethernet unit. The printer must be able to use the 8-bit, No-parity, 1-stop bit format used by the unit.

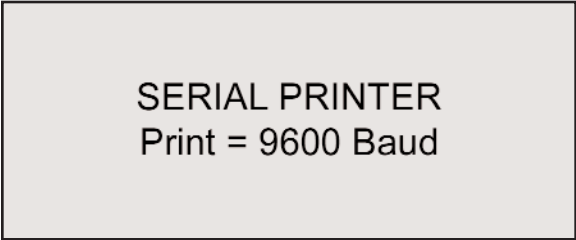
A serial printer and a bar code reader can also be used in tandem. A Y-cable will need to be

used to connect to the unit to permit the unit to communicate with the printer and bar code reader.. Additionally, if both a printer and a bar code reader are to be used with the unit, both will need to communicate at the same baud rate.

To make the Serial Printer function active, press the Enter button when this function is displayed.

A new display will open providing the option of leaving the function off or selecting a baud rate. To make the function active, use the Up and Down buttons to scroll to the baud rate that will be used to communicate with the printer.

Press the Enter button to store the new selection or press the Esc button to exit this setting without storing a new value.



Bar Code Reader

The Atlas Copco Open Protocol allows much more than the torque data to be reported across the ethernet, and some assembly operations desire to have such additional descriptive information. The TCV Ethernet eases the tasks associated with this by allowing the use of a bar code reader.

A serial bar code reader can be connected to the TCV-Ethernet unit to ease data input tasks for programming, as well.

There is only one serial port on the unit, so a Y-cable must be used if the bar code reader is to be used in tandem with a serial printer.

The front panel programming items that can be filled in via a bar code reader and bar code during programming are:

Cell ID	Channel ID	Control Name
Batch Reset	TCV Timer Min*	TCV Timer Max*

The following values to describe torque data more completely or to tie data to specific assemblies or specifications can be modified or have data entered via the bar code reader:

VIN Batch Size	Tool Serial Number	Job Number
Torque Min Limit	Torque Max Limit	Torque Final Target
Angle Min*	Angle Max*	Angle Final Target
Job Sequence Number	Parameter Set Name	

The asterisk (*) items are related. The TCV controls the use of the preset SLTC-FM Switch Wrench via the amount of time it spends in the “clicked” position. The AC Open Protocol does not have parameters for this, so it cannot be bar coded into the system. The SLTC-FM Switch Wrench does not have angle. This means that when in use, the parameter items can be used for time instead of angle, and that capability has been provided. Your specific application of the AC Open Protocol determines the applicability of some items.

Where no value is reported, the field is handled as required by the protocol.

The bar code reader must be set up to communicate using 8 bits, No-parity, and one stop bit, and the bar codes themselves must be properly formatted. See the bar code samples and rules below.

To program the unit to work with a bar code reader, scroll to the Bar Code Reader function in the display. Press the Enter button when the item is active.

PROGRAMMING
Bar Code Reader

Use the Up and Down arrow button to scroll through the available options. The options are Off and the available baud rates for communication with the reader. Note that if a serial printer is used in tandem with a bar code reader, the two must communicate at the same baud rate. When the desired option or baud rate is displayed on the screen, press the Enter button to select and set it.

BAR CODE READER
B-Code = 9600 Baud

Bar Code Rules and Examples

To have the bar code reader decipher a given bar code as a command, the bar code must be formatted in a specific way. Using code 39 bar codes, the bar code must begin and end with an asterisk “*”.

The bar code will also contain command and data sections. Each section of the bar code will be separated by percent “%” symbols.

For example, the command for the Cell ID is 01. The Cell ID data string is 4 data bytes long. So if the assigned Cell ID was programmed to be 1234, then the bar code would look like this:



Bar code samples and rules for various commands and common uses are given on the pages immediately following.

Bar Code - Cell ID

Command = 01, Data Bytes = 4



Bar Code - Channel ID

Command = 02, Data Bytes = 2



Bar Code - Control Name

Command = 03, Data Bytes = 1 to 25



Bar Code - VIN

Command = 04, Data Bytes = 1 to 25

Note: The VIN number can also be represented without a command. As a consequence, all alphanumeric bar codes without commands will be interpreted as VIN numbers.



Bar Code - Job Number

Command = 05, Data Bytes = 4



Bar Code - Batch Size

Command = 09, Data Bytes = 4

Note: The maximum batch size is 255.



Bar Code - Torque Min Limit

Command = 21, Data Bytes = 6



Bar Code - Torque Max Limit

Command = 22, Data Bytes = 6



Bar Code - Torque Final Target

Command = 23, Data Bytes = 6



Bar Code - Angle Min*

Command = 25, Data Bytes = 5

Note: Angle Min represents Timer Min in the TCV-Ethernet. The Timer Max is 2.55 seconds, programmed as 255, and the Timer Min must be less than the Timer Max.

**Bar Code - Angle Max***

Command = 25, Data Bytes = 5

Note: Angle Max represents Timer Max in the TCV-Ethernet. The Timer Max is 2.55 seconds, programmed as 255, and the Timer Max must be greater than the Timer Min.

**Bar Code - Angle Final Target**

Command = 27, Data Bytes = 5

**Bar Code - Job Sequence Number**

Command = 42, Data Bytes = 5

**Bar Code - Parameter Set Name**

Command = 47, Data Bytes = 1 - 25

**Bar Code - Batch Reset**

Command = 10, Data Bytes = 0



FM Switch Wrench Communications

The FM Switch Wrench has on it a transceiver that has a unique identifier. This permits the system to identify the transceiver, and hence the tool, with which it is to work.

The TCV-Ethernet unit can “learn” which tool it is to work with through either of two ways. The tool can be learned through a programming function as previously addressed, but there is a faster and simpler way in which to create the association between the unit and the tool.

1. Turn the power to the unit on.
2. Place the key in the keyed lock in the side of the unit.
3. Turn the key from the vertical locked position clockwise to the horizontal program position.
4. Check that the STRENGTH/PROG LED illuminated.
5. Click the FM Switch Wrench to be used with this unit and hold it in the “clicked” position for four seconds.
6. Turn the key back to the vertical locked position.

The FM Switch Wrench transmitter is now associated with that TCV-Ethernet unit.

Should the transmitter be damaged later in use, or if a different wrench with a different transmitter is to be used, the process will have to be repeated with the new or repaired tool before the TCV-Ethernet and Switch Wrench will work as a system.

Ethernet Functions

The TCV-Ethernet acts as a server. It waits for a client to make a connection with it. It can only accept one connection at a time.

The TCP/IP messages that are used by this unit adhere to the PowerFocus Open Protocol Version 3.0.

Supported Commands

The unit will respond to the following commands:

MID	DESCRIPTION
0001	Communications Start
0003	Communications Stop
0010	Parameter set numbers upload request
0012	Parameter set data upload request
0014	Parameter set selected subscribe
0017	Parameter set selected unsubscribe
0019	Set parameter set batch size
0020	Reset parameter set batch size
0050	Vehicle ID number download request
0060	Last tightening result data subscribe
0062	Last tightening result data acknowledge
0063	Last tightening result data unsubscribe
0064	Old tightening result upload request
0080	Read time upload request
0082	Set time in torque controller
9999	Keep Alive

Supported Responses

This unit will send the following information:

MID	Description
0002	Communications Start Acknowledgement
0004	Command Error
0005	Command Accepted
0011	Parameter set numbers upload reply
0013	Parameter set data upload reply
0061	Last tightening result data upload
0065	Old tightening result reply
0081	Time upload reply

Dimensions

