

**HP COOL TECH, INC.**

# *PowerPump*

**INSTALLATION MANUAL  
HANWHA XD20/XD26  
Series 12000**



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Please read and understand the contents of this manual prior to installation of the HP Cool Tech High Pressure Coolant Pump. Failure to follow Installation, Safety or Checklist Instructions may result in damage to the unit, or injury to personnel.

## INTRODUCTION

We are proud to bring to market the HP Cool Tech, Inc high pressure coolant pump, a high pressure coolant delivery system that is competitive with similar systems on the market today.

The HP Cool Tech, Inc high pressure coolant pump was developed in a machine shop, by machinists, for use in the machine shop environment.

Their hands on experience has resulted in the design and development of a unit that solves "real world" problems and helps meet the demands of today's fast paced manufacturing environment.

The HP Cool Tech, Inc high pressure coolant pump will facilitate the processing of a variety of materials through the delivery of high pressure coolant at stable temperatures right to the contact point of tooling and material. Chips will be evacuated at a rapid rate which will permit the use of more aggressive feeds and speeds. This in turn will result in shorter cycle times, improved finishes and increased tool life.

### Specifications

Main Motor	10 HP
Voltage	208/230/460-3 Phase 60 HZ
Control Power	24 VDC
Feed Pressure	5-50 PSI
Fluid Type	Vascomill HD 22 or Equivalent
Output Ports	4/8
Output Pressure	Electronic, Multi Pressure 50-2000 PSI
Flow Rate	Variable Volume up to 8.0 GPM
Filter	5u
Dry Weight	600 LBS

## **WARNING!!!**

**This unit is designed to produce a flow of coolant at extremely high pressure! AS SUCH:**

- 1. All hoses must be secured to hold 2,000 lbs of pressure.**
- 2. All guards and safety features must be in place on machine.  
Coolant running at high pressure can cut or inject into the body.**
- 3. Safety glasses must be worn while using this equipment, High pressure oil can cause serious, permanent eye injury.**
- 4. Small pinholes must be repaired immediately as they have a potential to cause injury.**
- 5. Only trained personnel should operate, repair or maintain the DP Tech, Inc High pressure pump.**

## SAFETY

Warning to End User of the HP Cool Tech, Inc high pressure coolant pump

This system is designed to deliver coolant under high pressure to your machining process. Precautions must be taken to protect personnel and equipment.

1. The HP Cool Tech, Inc high pressure coolant pump must be installed by qualified technicians
2. All machine doors must be in place with all safety locks in operating condition prior to operating the HP Cool Tech, Inc high pressure coolant pump.
3. Certain oils can form a mist under high pressure operating conditions. This represents a potential fire hazard. Therefore, it is recommended that the machine be attended during operation or fire suppression equipment be installed.
4. Prior to installation it is recommended that any cracked or missing guards on the machine be replaced.
5. Chip guards and spindle caps must be in place prior to use of the HP Cool Tech, Inc. high pressure system.
6. Careful consideration must be given to oil line placement while using the HP Cool Tech, Inc high pressure coolant pump as the high pressure can force fine chips into areas of the machine required to remain free of machining debris. (Collets, Guide Bushing, Collet Slots, etc)  
Regular maintenance of these areas should be performed to prevent excessive build up.
7. High voltage is present in the cabinet of the HP Cool Tech, Inc high pressure coolant pump and should be serviced by qualified personnel only.
8. PRIOR TO the beginning of maintenance or repair of the HP Cool Tech, Inc high pressure coolant pump, the assigned technician will:
  - A. Locate and render inoperative any energy providing sources to the equipment.  
These sources include, but are not limited to:
    - Electrical
    - Mechanical
    - Stored energy such as springs and air pressure
9. Due to the potential for mist / smoke to form under high pressure conditions, the use of a mist control or air filtration device is recommended.

## **INSTALLATION**

**ALL PRECAUTIONS IN THE SAFETY SECTION OF THIS MANUAL MUST BE MET PRIOR TO INSTALLATION.**

1. The HP Cool Tech, Inc high-pressure pump requires either 208 or 460 volt 3 phase-dedicated line. A qualified technician must perform connection to power.
2. Uncrate the HP Cool Tech, Inc high-pressure pump and inspect for damage.
3. The unit must be installed in a location with consideration given to access to the electrical panel and the pump filter as this will need to be accessed during the course of routine maintenance.
4. Install the filter bag, follow the instructions in the operations manual. Do not turn on coolant at this time.
5. **BEFORE PROCEEDING ANY FURTHER, BACKUP THE CNC PARAMETERS AND LADDER TO A FLASH CARD. SEE PAGES THE FOLLOWING PAGES.**

## Hanwha XD20 26 and 32 Backup Procedure

### **BACK UP PROCEDURE MUST BE PERFORMED PRIOR TO MAKING ANY CHANGES TO LADDER PROGRAM OR KEEP RELAYS**

Press Set/OFS to setting parameter

Page + or – to 00020 (I/O channel) set to “4”, if not “4”, press #4 then input

Insert memory card

Press “Edit” key

Press “System” key

Press + soft key to “PMC MAINTE”

Press “I/O” soft key

Select “Memory Card”

    “Write”

    “Parameter”

Press “OPRT” soft key

Press “New Name” soft key. Make sure file name is created. Write down file name.

Press “EXEC” soft key. Status will change from writing to complete.

Select “Memory Card”

    “Write”

    “Sequence Program”

Press “New Name” soft key. Make sure file name is created. Write down file name.

Press “EXEC” soft key. Status will change from writing to complete.

Remove card

## Hanwha XD20 and 26 Keep Relay and Ladder Modifications

### KEEP RELAY

Press “Edit Key”

Press “System Key”

Press + soft key to “PMC MAINTE”

Press + soft to “Keep Relay”

Press “Keep Relay” soft key

Change keep relays as required. See installation manual for keep relay settings.

## PMC LADDER

Press "System Key"  
Press + soft key to "PMC LADDER"  
Press "OPRT" soft key  
Press "Edit" soft key  
Press + soft key to "Stop"  
Press "Yes" soft key  
Keyboard type "X57.0"  
Press "Search" soft key. Make a note of the line number for X57.0.  
Press "Next" soft key. Make a note of the line number for X57.0  
Again press "Next" soft key. Make a note of the line number for X57.0  
Press "Exit" soft key  
Highlight X57.0 on first recorded line number  
Press "Zoom" soft key  
Change X57.0 from N.O. to N.C.  
Press + soft key to "Exit Zoom"  
Press "Exit Zoom" soft key  
Highlight X57.0 on second recorded line number  
Press "Zoom" soft key  
Change X57.0 from N.O. to N.C.  
Press + soft key to "Exit Zoom"  
Press "Exit Zoom" soft key  
Highlight X57.0 on third recorded line number  
Press "Zoom" soft key  
Change X57.0 from N.O. to N.C.  
Press + soft key to "Exit Zoom"  
Press "Exit Zoom" soft key  
Press "Exit Edit" soft key  
Press "Yes" soft key  
Press "Edit" soft key  
Press + soft key to "Run"  
Press "Yes" soft key  
Press "Exit Edit" soft key



## PowerPump MODBUS SETUP ON FANUC oi-t CONTROL

### Software:

Hard "SYSTEM" key

Soft "SYSTEM" key

Page down until you see "Software 658"

Verify 658E Edition 0006 or above and 658F Edition 0005 or above.

Purchase and Install Fanuc option "**A02B-0319-R968**"

### Set the following parameters:

904.6            "0"

8132.2          "1"

14880.6        "0"

14882.1        "1"

### Set the following keep relay:

99.7            "1"

### Ladder:

Output ladder from subject machine and e-mail to [richard@hpcooltech.com](mailto:richard@hpcooltech.com).

The ladder will be modified and sent back by e-mail.

Input the revised ladder to subject machine.

### CAT5e cable connection:

Remove back cover on CNC monitor cabinet.

Inside the cabinet, locate the female Ethernet connector which has a short cable

attached. Remove the female connector from the cabinet mount and leave the existing cable attached.

Route the CAT5e cable thru the CNC and into the monitor cabinet thru the mounting arm and plug the cable into the female connector. Reinstall the cabinet back.

## SYMBOL AND COMMENT SETUP

Enter or edit the symbol and comment data following the procedure outlined in paragraph 9.2.3 thru 9.2.4.

<u>ADDRESS</u>	<u>SYMBOL</u>	<u>COMMENT</u>
A0100.0	AL1500	HP INVERTER ALARM
A0100.1	AL1501	HP LOW PRESSURE ALARM
A0100.2	AL1502	HP CLOG FILTER ALARM
A0100.3	WN2500	HP WARN CHANGE FILTER BAG
A0100.4	AL1503	HP OVER PRESSURE
A0100.5	WN2501	HP WARN ACT PRESS > SETPOINT
A0100.6	WN2502	HP WARN ACT PRESS < SETPOINT
A0100.7	AL1504	HP SETPOINT EXCEEDS HIGH LIMIT
A0101.0	AL1505	HP COMM LOSS ALARM

## MESSAGE DATA

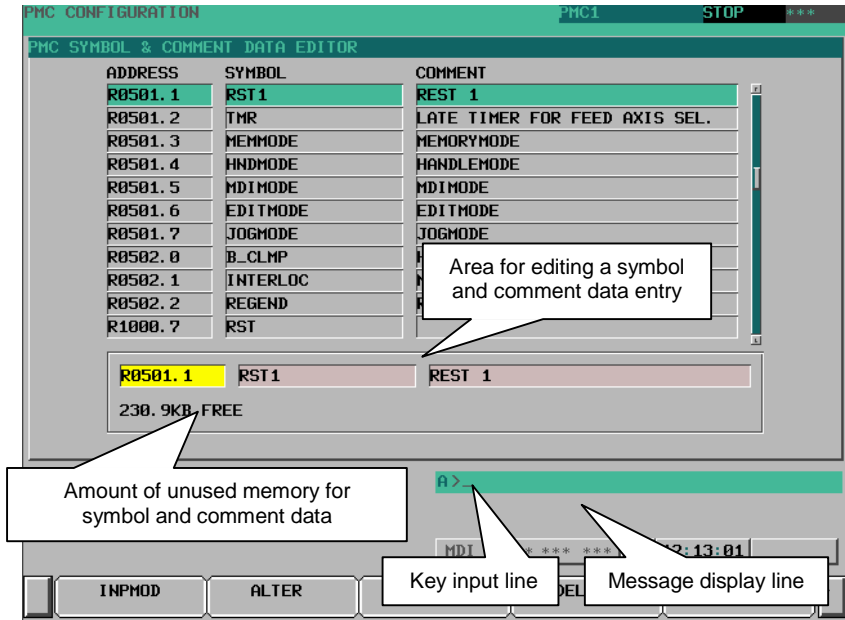
Enter or edit the message data following the procedure outlined in paragraph 9.3.1 thru 9.3.2.

<u>ADDRESS</u>	<u>NO</u>	<u>MESSAGE</u>
A0100.0	1500	HP INVERTER ALARM
A0100.1	1501	HP LOW PRESS ALARM
A0100.2	1502	HP CLOG FILTER ALARM
A0100.3	2500	HP WARN CHANGE FILTER BAG
A0100.4	1503	HP OVER PRESSURE
A0100.5	2501	HP WARN ACT PRESS > SETPOINT
A0100.6	2502	HP WARN ACT PRESS < SETPOINT
A0100.7	1504	HP SETPOINT EXCEEDS HIGH LIMIT
A0101.0	1505	HP COMM LOSS ALARM

### 9.2.3 Partially Changing Symbol and Comment Data

On the SYMBOL & COMMENT DATA EDITOR screen, pressing the [ZOOM] soft key displays the following screen. At the bottom of the screen, the area for editing a symbol and comment data entry appears. You can define a symbol for a desired address byte or bit and add a comment. You can also change already defined symbol and comment data.

For a registered data entry, you can edit the address, symbol, and comment in character units.



Amount of unused memory:

The amount of unused memory for editing symbol and comment data is displayed.

Area for editing a symbol and comment data entry:

Enter an address, symbol data, and comment data.

#### Screen operations

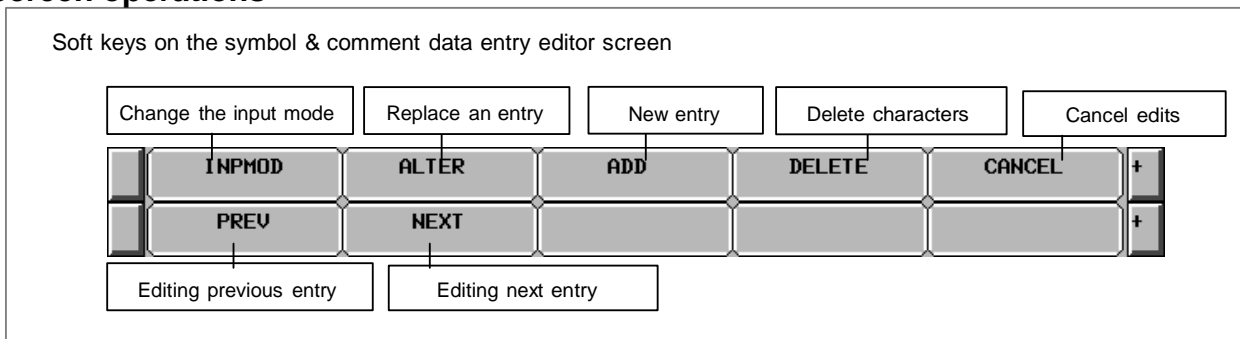
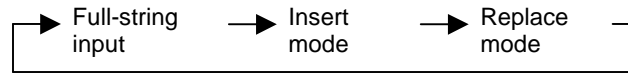


Fig. 9.2.3 Soft keys on the symbol & comment data entry editor screen

## (1) Operations using the soft keys

## (a) [INPMOD] Change the input mode

Pressing the [INPMOD] soft key changes the input mode. The selection cycles in the following order. In the insert mode, "INSERT" appears on the screen; in the replace mode, "ALTER" appears.



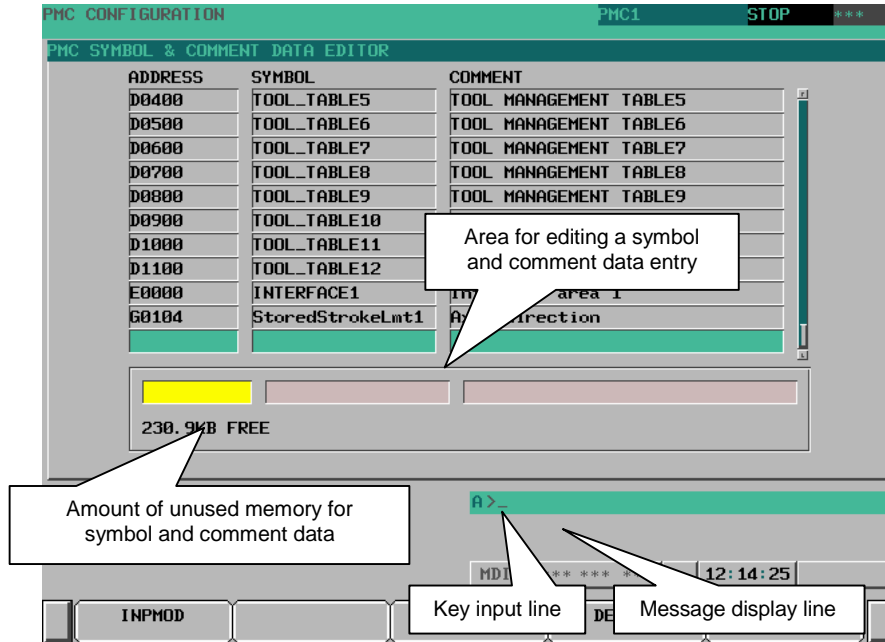
- Full-string input  
The entire string at the cursor is selected and replaced with an input string.
  - Insert mode  
Input characters are inserted at the cursor. Pressing the INPUT key with inputting no characters inserts one space.
  - Replace mode  
Input characters replace characters at and after the cursor. Pressing the INPUT key with inputting no characters replaces the character at the cursor with a space.
- (b) [ALTER] Replace an entry  
Replaces the target entry with edit data. When the data in the address field is updated and the address is a new one, the original data corresponding to the old address is deleted and the edit data is registered as a new entry. If an address to be registered as a new one is already registered, a confirmation message appears, which asks you if you are sure to overwrite the old data.
- (c) [ADD] New entry  
Registers input data as a new entry. If the address of the new entry is already registered, a confirmation message appears, which asks you if you are sure to overwrite the old data.
- (d) [DELETE] Delete characters  
Performs either of the following deletions:
- In the full-string input mode  
Deletes the string at the cursor.
  - In the insert or replace mode  
Deletes one character at the cursor.
- (e) [CANCEL] Cancel edits  
Cancels edits and switches to the SYMBOL & COMMENT DATA EDITOR screen. The data is not updated.
- (f) [PREV] Editing previous entry  
You can edit a symbol and comment on previous entry without leaving from editing mode.
- (g) [NEXT] Editing next entry  
You can edit a symbol and comment on next entry without leaving from editing screen.

## (2) RETURN key operation

On the symbol & comment data entry editor screen, the return key operation is disabled. To terminate editing of a symbol and comment data entry and return to the SYMBOL & COMMENT DATA EDITOR screen, use the [EXIT] soft key.

## 9.2.4 Registering New Symbol and Comment Data

On the SYMBOL & COMMENT DATA EDITOR screen, pressing the [NEW] soft key displays the following screen. At the bottom of the screen, the area for editing a symbol and comment data entry appears. You can register new entry data.



Amount of unused memory:

The amount of unused memory for editing symbol and comment data is displayed.

Area for editing a symbol and comment data entry:

Enter an address, symbol data, and comment data.

### Screen operations

Symbol & comment data entry editor screen

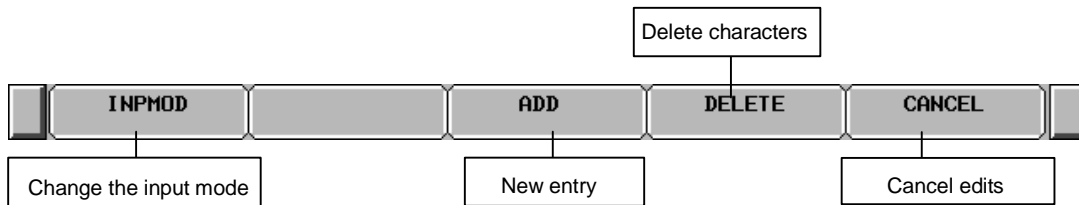
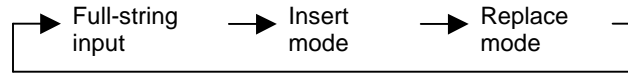


Fig. 9.2.4 Soft keys on the symbol & comment data entry editor screen

## (1) Operations using the soft keys

## (a) [INPMOD] Change the input mode

Pressing the [INPMOD] soft key changes the input mode. The selection cycles in the following order. In the insert mode, "INSERT" appears on the screen; in the replace mode, "ALTER" appears.



- Full-string input  
The entire string at the cursor is selected and replaced with an input string.
- Insert mode  
Input characters are inserted at the cursor. Pressing the INPUT key with inputting no characters inserts one space.
- Replace mode  
Input characters replace characters at and after the cursor. Pressing the INPUT key with inputting no characters replaces the character at the cursor with a space.

## (b) [ADD] Register new entry data

Registers input data as a new entry. If the address of the new entry is already registered, a confirmation message appears, which asks you if you are sure to overwrite the old data.

## (c) [DELETE] Delete entry data

Performs either of the following deletions:

- In the full-string input mode  
Deletes the string at the cursor.
- In the insert or replace mode  
Deletes one character at the cursor.

## (d) [CANCEL] Cancel edits

Cancels edits and switches to the SYMBOL & COMMENT DATA EDITOR screen. The data is not updated.

## (2) Screen operation using other keys

Cursor keys: Move the cursor.

## (3) RETURN key operation

On the symbol & comment data entry editor screen, the return key operation is disabled. To terminate editing of a symbol and comment data entry and return to the SYMBOL & COMMENT DATA EDITOR screen, use the [EXIT] soft key.

## 9.3 DISPLAYING AND EDITING MESSAGE DATA ([MESSAGE] SCREENS)

### 9.3.1 Displaying Message Data

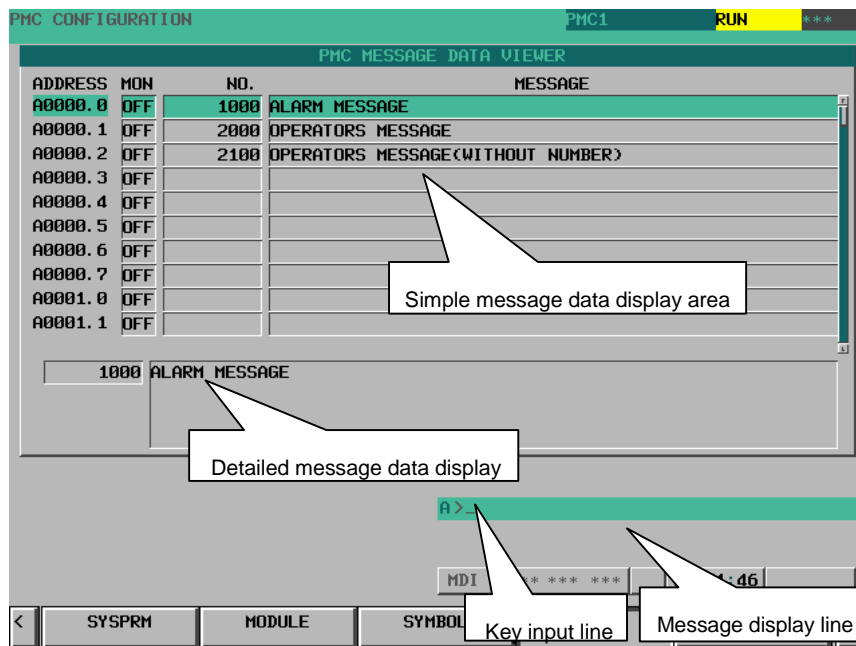
On the MESSAGE DATA VIEWER screen, you can check each external message data item output to the NC screen by functional instruction DISPB.

To display the MESSAGE DATA VIEWER screen, press the [MESSAGE] soft key. On the MESSAGE DATA VIEWER screen, you can perform the following operations:

- Moving to the MESSAGE DATA EDITOR screen [EDIT]
- Searching for message data [SEARCH]
- Previewing message data [PVIEW]

#### NOTE

Multi-language message data are not displayed on this screen. When you create or edit the data, use FANUC LADDER-III.



#### Description of items in the table

- ADDRESS: Message address
- MON: Current status of the message requests (A addresses)
- NO.: Message number
- MESSAGE: Message data

#### Screen configuration

- (1) On the screen, message addresses, message requesting monitors, message numbers, and message data are displayed from left to right. A message requesting monitor indicates the status of the signal (A addresses) of the message address. In the simple message data display area, the first line of data is displayed.
- (2) In the detailed message data display at the bottom of the screen, message data at the cursor is all displayed.
- (3) On the message display line at the bottom of the screen, an error message appears when issued.

## Screen operations

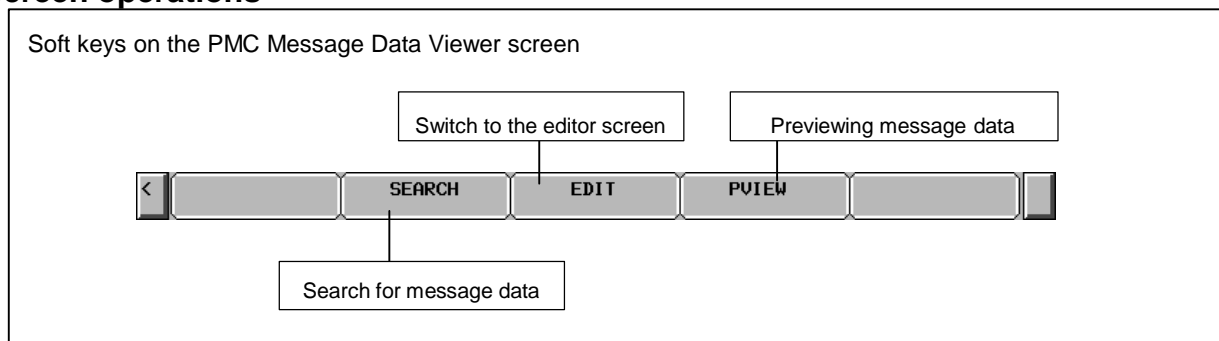


Fig. 9.3.1 Soft keys on the MESSAGE DATA VIEWER screen

- (1) Operations using the soft keys
  - (a) [SEARCH] Search for message data  
Searches for the address for which message data containing an address, message number, or string corresponding to the input string is set and displays the message data on the screen.  
When a byte address is searched for, a bit 0 address is found.  
Example)  
When A2 is searched for, the cursor moves to A2.0.
  - (b) [EDIT] Switch to the editor screen  
Moves to the MESSAGE DATA EDITOR screen.

### NOTE

When the programmer protection function is enabled, the [EDIT] soft key appears and is available. When the online monitor function is enabled, you cannot move to the MESSAGE DATA EDITOR screen. For details, see Section 6.2.

- (c) [PVIEW] Previewing message data  
Displays a character code enclosed by at signs (@) with the corresponding character actually displayed.  
Example)  
Kana:   "@B6C532@" → "カナ 2"  
Kanji:   "@0248733E6F44643B5F01@100" → "非常停止 100"  
European character type 1: UNZUL@0DC101@SSIGE → "UNZULÄSSIGE"  
European character type 2: C@0EA501@MBO@0EA801@ → "СИМБОЛ"  
European character type 3: @05ED01@123 → " § 123"

To terminate preview display, press the [EXIT] soft key.

- (2) Screen operation using other keys  
Use cursor and page keys to change the message data in the detailed message data display.

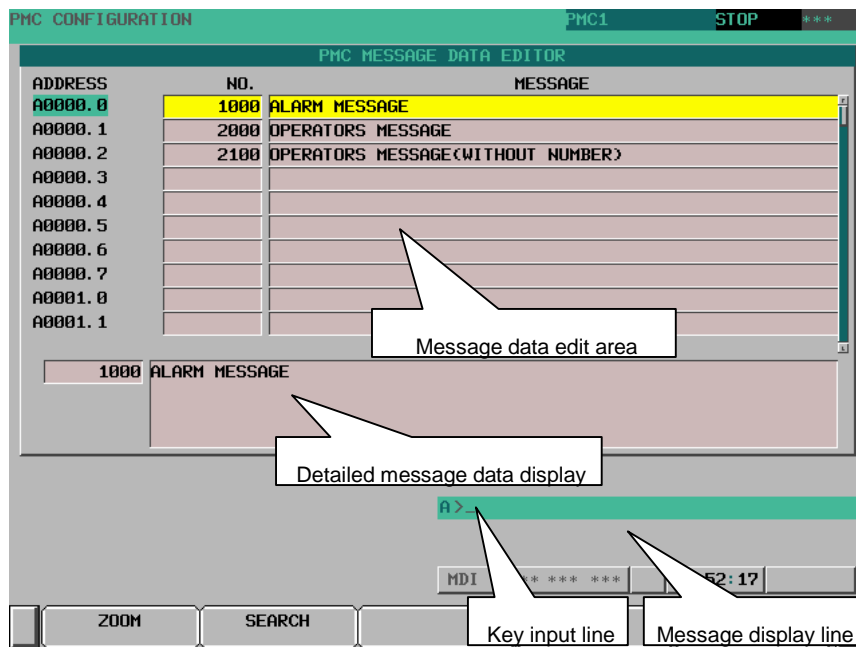


## 9.3.2 Editing Message Data

On the MESSAGE DATA EDITOR screen, you can edit message data items.

To move to the MESSAGE DATA EDITOR screen, press the [EDIT] soft key on the MESSAGE DATA VIEWER screen. On the MESSAGE DATA EDITOR screen, you can perform the following operations:

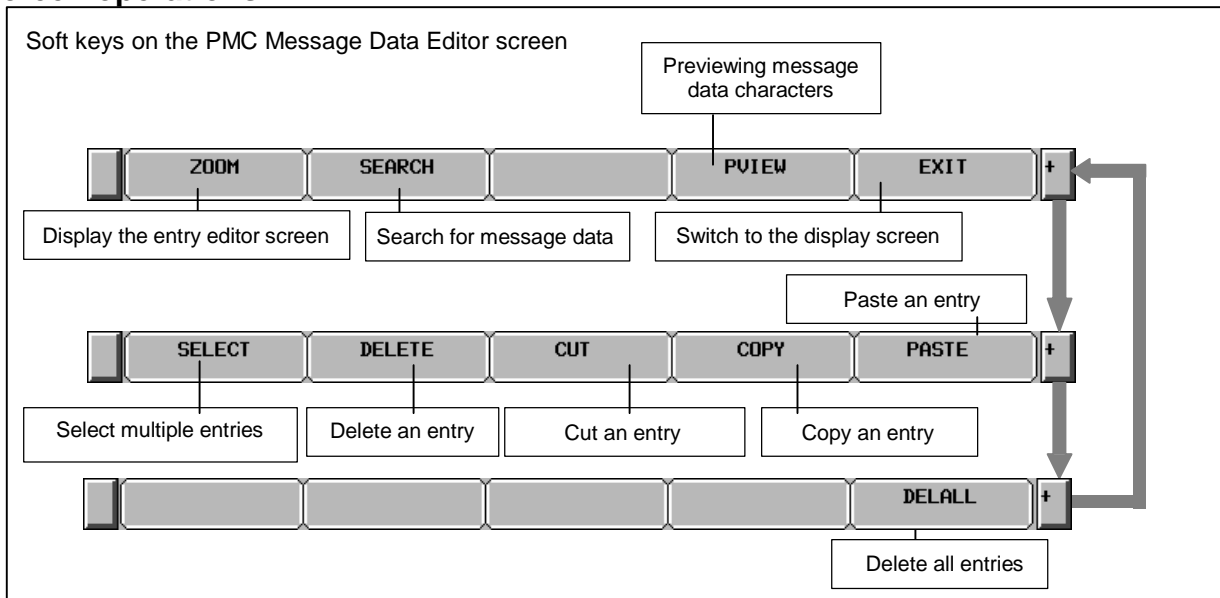
- Moving to the message data entry editor screen [ZOOM]
- Searching for message data [SEARCH]
- Previewing message data [PVIEW]
- Moving to the MESSAGE DATA VIEWER screen [EXIT]
- Selecting multiple entries [SELECT]
- Deleting an entry [DELETE]
- Moving an entry [CUT] and [PASTE]
- Copying an entry [COPY] and [PASTE]
- Deleting all entries [DELALL]



### Screen configuration

- (1) On the screen, message addresses, message numbers, and message data are displayed from left to right. In the message data edit area, the first line of data is displayed.
- (2) In the detailed message data display at the bottom of the screen, message data at the cursor is all displayed.
- (3) On the message display line at the bottom of the screen, an error message appears when issued.

## Screen operations



**Fig. 9.3.2 Soft keys on the MESSAGE DATA EDITOR screen**

- (1) Operations using the soft keys
  - (a) [ZOOM] Switch to the entry editor screen  
Moves to the entry editor screen for message data to edit entry data at the cursor.
  - (b) [SEARCH] Search for message data  
Searches for an address, message number, or message data string. The operation method conforms to that for [SEARCH] on the MESSAGE DATA VIEWER screen. For details, see "Screen operations" for the MESSAGE DATA VIEWER screen.
  - (c) [PVIEW] Previewing message data  
Displays a character code enclosed by at signs (@) with the corresponding character actually displayed.  
The operation method conforms to that for [PVIEW] on the MESSAGE DATA VIEWER screen. For details, see "Screen operations" for the MESSAGE DATA VIEWER screen.
  - (d) [EXIT] Switch to the display screen  
Terminates editing of message data and moves to the MESSAGE DATA VIEWER screen.
  - (e) [SELECT] Select multiple entries  
Use this key to specify multiple entries to be edited with a soft key such as [DELETE]. Pressing this soft key puts the screen into the mode for selecting multiple entries starting from the entry being edited at that time. Move the cursor and use the search function so that the entries to be edited are selected. After the entries to be edited are selected, edit them by pressing each edit soft key. When you want to delete, move, or copy multiple entries, use this soft key to select multiple entries.
  - (f) [DELETE] Delete an entry  
Deletes a selected entry.
  - (g) [CUT] Cut an entry  
Cuts a selected entry. The cut data is transferred to the pasting buffer and deleted from message data. The contents of the pasting buffer before the data is transferred are erased. When you want to move data from an entry to another, use this soft key together with the [PASTE] soft key.
  - (h) [COPY] Copy an entry  
Transfers a selected entry to the pasting buffer. The message data is not changed. The contents of the pasting buffer before the data is transferred are erased. When you want to copy data in an entry to another, use this soft key together with the [PASTE] soft key.

- (i) [PASTE] Paste an entry  
Replaces data at the cursor with the entry transferred to the pasting buffer by the [CUT] or [COPY] soft key. When the contents of the pasting buffer are pasted by pressing the [PASTE] soft key, they are not erased. The contents of the pasting buffer are retained until the power to the NC is turned off.
  - (j) [DELALL] Delete all entries  
Deletes all message data.
- (2) Editing message data for an entry at a time  
Message data for an entry is input at a time.
- (a) Standard specification  
Enter a message string following a message number with delimiting them by a semicolon (;) as shown below and press the INPUT key.  
message-number;message-string  
Example: 2001; ABCDEFG INPUT key
  - (b) Extended specification  
Enter a message string following a message number in the extended specification format as shown below and press the INPUT key.  
message-number;message-string  
Example: AL1+000= ABCDEFG INPUT key  
OP1+999= ABCDEFG INPUT key

**NOTE**

For details of the extended specification of message number, see the description of Extended specification in Subsection 4.11.1.(iv)

- (3) Screen operation using other keys  
Use cursor and page keys to change the message data in the detailed message data display.
- (4) RETURN key operation  
On the MESSAGE DATA EDITOR screen, the return key operation is disabled. To terminate editing of message data and return to the MESSAGE DATA VIEWER screen, use the [EXIT] soft key.

## MODBUS COMMON and TCP SETTINGS

When the Fanuc Modbus Option has been installed and the parameters are set, input the following settings for the Common and Modbus/TCP SERVER setting screens. Format of the screens are the next 2 pages.

### COMMON: SETTING[EMBEDDED]

#### BASIC 1/2

IP ADDRESS	169.254.163.150
SUBNET MASK	255.255.255.0
ROUTER IP	MUST BE BLANK, USE "SP" KEY

### Modbus SERVER:SET[EMBEDDED]

#### BASIC 1/4

PORT NUMBER (TCP)	502
RSV	ALL "0"
STATUS PMC ADDRESS	R2400

#### AREA1 2/4

DATA MODBUS ADDRESS	1
DATA PMC ADDRESS	E0100
DATA SIZE(WORD)	6

#### AREA2 3/4

DATA Modbus ADDRESS	1
DATA PMC ADDRESS	MUST BE BLANK, USE "SP" KEY
DATA SIZE (WORD)	0

#### AREA3 4/4

DATA Modbus ADDRESS	10
DATA PMC ADDRESS	E0200
DATA SIZE (WORD)	4

## COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).

Fig.1-1 COMMON screen (BASIC)

### Setting item

Item	Description
IP ADDRESS	Specify the IP address of Embedded Ethernet. (Example of specification format "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format "192.168.0.253")

### Display item

Item	Description
MAC ADDRESS	Embedded Ethernet MAC address.
AVAILABLE DEVICE	Enabled device of Embedded Ethernet. Either Embedded Ethernet port or PCMCIA Ethernet card is displayed.

			21	Title	Series 30i/31i/32i/35i-B, Power Motion i-A, 0i-D Modbus/TCP Server function on Embedded Ethernet specification
				Draw No.	A-94615E

## Modbus/TCP SERVER setting screens

Press soft key [Modbus SET] to display the Modbus/TCP SERVER SETTING screen.

Fig.1-2 Modbus/TCP SERVER SETTING (BASIC)

Fig.1-3 Modbus/TCP SERVER SETTING (AREA1-3)

### NOTE

AREA2 and 3 setting item displayed on the Modbus/TCP SERVER SETTING screen 3 and 4. Items are the same as AREA 1.

### Setting item

Item	Description
PORT NUMBER (TCP)	Specify the port number for using Modbus/TCP Server function. The input range is from 0 to 65535. Usually, set 502. When 0 is set, the Modbus/TCP Server function is not operated.
OPTION1	Bit 0 : BCE Byte arrangement in the Modbus area is assumed to be 0 : a little endian 1 : a big endian Bit 1 – 7 : RSV Be sure to set 0.
STATUS PMC ADDRESS	The top address in the E/R area of PMC that stores status is set. The setting range depends on an effective PMC area. This status is occupied by one byte. Specify a space (blank) when not using this status. In this case, "---" is displayed.
DATA Modbus ADDRESS	The top address in Modbus area (Holding registers) where I/O is exchanged for the Modbus/TCP client is set. The setting range is 1 – 65536.
DATA PMC ADDRESS	The top address in E/R/D area of PMC that exchanges I/O for the Modbus/TCP client is set. The setting range depends on an effective PMC area. Only the even-numbered address can be set. Specify a space (blank) when not exchanging I/O. In this case, "---" is displayed.
DATA SIZE	The data size (unit: word size) that exchanges I/O for the Modbus/TCP client is set. The setting range depends on an effective PMC area. Set 0 when not exchanging I/O.

			22	Title	Series 30i/31i/32i/35i-B, Power Motion i-A, 0i-D Modbus/TCP Server function on Embedded Ethernet specification
				Draw No.	A-94615E

**TURN THE MACHINE MAIN POWER OFF BEFORE BEGINNING INSTALLATION.**

1. Install bulkhead connectors.  
See photos to identify gang and backwork panels. Use straight bulkhead connectors on gang and straight bulkhead connectors and 90 degree male/female adaptors on backwork panels.
2. Install 2" bushing. See photo for position.
3. Attached colored wire ties to pump outlets, bulkhead connectors and hoses using the color-coding chart in owners manual.
4. Route and connect all the hoses to the bulkhead connectors and the high-pressure pump. Hose placement is critical and consideration to sharp edges, corners and moving machine components must be given to hose placement to avoid damage to the hoses during normal operation. The hoses will move when they are pressurized.
5. Remove the air line and fitting from the sub spindle ejector tube and replace the fitting with a 1/4" JIC x 1/8" MNPT 90 degree fitting. Be sure that the fitting does not strike the rear cabinet when the ejector is in the home position and the sub spindle is at the maximum Z travel position.
6. Install internal high-pressure hose to the bulkhead connector and ejector fitting. Route the hose to the bulkhead connector.
7. Install all remaining internal high-pressure hoses.
8. **VERIFY THAT ALL THE HOSE CONNECTIONS ARE TIGHT.**
9. Install a tee and hose barb between the flood coolant pump and the flexible flood coolant line. Use thread sealant on all the threads
10. Assemble 1" hose barb and 1" nipple to 90 degree elbow. Use thread sealant on the threads.
11. Install pipe assembly into coolant tank with one lock nut on each side of the tank cover.
12. Using 1" hose connect the flood coolant outlet from the installed tee to the inlet of the high pressure pump and tighten the clamps
13. Using 1" hose connect return from the installed polypropylene bulkhead to the outlet of the high-pressure pump and tighten the clamps.
14. **TURN THE HIGH PRESSURE DISCONNECT OFF. OPEN ELECTRICAL ENCLOSURE AND TURN OFF THE TWO CIRCUIT BREAKERS.**
15. Using a qualified technician, electrically connect the high pressure pump to the power supply.
16. Verify the voltage at the disconnect of the high-pressure pump.

17. Turn on the high pressure disconnect and the 2 pole circuit breaker and verify the voltage and the line side of the 2 pole circuit breaker. **THIS MUST BE 208/220 VOLTS LINE TO LINE FOR 220 VOLT SERVICE . 460/480 VOLT LINE TO LINE FOR 460 VOLT SERVICE.**
18. Turn on the two 1 pole circuit breakers and verify that the PLC run light is on.
19. Verify the rotation of pump motor
  - Remove orange cover from coupler
  - An arrow on the pump indicates the direction the motor/pump should turn
  - Verify the motor/pump is turning in direction of the arrow
  - Replace the coupler housing cover
20. Close electrical cabinet door, lock and turn on disconnect.
21. Power up the CNC.
22. Open the drain valve, turn on the flood coolant and run for 1 minute. Close the drain valve, leave flood coolant on, and check for leaks. Run flood coolant until a steady flow of oil runs thru purge line. The pump is now primed.
23. MDI sub spindle high-pressure line M218, M219 on 8 line pump or M209, M210 on a 4 line pump. Single block first M code with pressure set at 500 PSI. Run for 1 minute to flush the system. Check for leaks. Single block last M code.
24. Perform the installation checklist, initial, date and sign.
25. The warrantee will be void without a signed copy of the installation checklist returned to the vendor.



**FOLLOWING INSTALLATION THE FOLLOWING CHECKLIST MUST BE COMPLETED PRIOR TO PLACING THE HP COOL TECH, INC. HIGH PRESSURE PUMP INTO SERVICE. CHECK FOR / RESOLVE LEAKS THROUGHOUT TESTING.**

#	TEST FUNCTION	VERIFIED BY
1	Fan Rotation	
2	Motor Rotation	
3	Bag filter in place, cover secured	
4	All lines properly connected	
5	Check for leaks, resolve as needed	
6	MAIN SPINDLE- MDI mode Program: #1132=1000 EOB M218 EOB CYCLE START verify through sub spindle coolant is operational, check for leaks	
7	With coolant running, slowly open spindle door, verify high pressure pump shuts off. Repeat process with main door.	
8	MAIN SPINDLE- MDI mode Program: #1132=1000 EOB M218; EOB CYCLE START shut off coolant flow at operator panel, verify pump stops	
9	1. Flood Coolant Pump OFF 2. Cycle start High Pressure Pump (M218) 3. Verify the control generates M code finish error after time out	
10	Verify the high pressure pump shuts off along with the flood coolant via the following commands: 1. M9 (MDI Mode) 2. -Coolant off- hard key	
11	Verify the high pressure pump shuts off when RESET hard key is depressed.	
12	In Automatic Mode, with either door OPEN: -Verify machine will not cycle -Verify door must be closed and RESET hard key is pressed before machine will cycle	
13	With high pressure pump ON, depress E-STOP hard key, verify high pressure pump turns off	
14	<b>REPEAT STEPS 6 THRU 13 WITH SUB SPINDLE</b>	
15	<b>VERIFY FUNCTION OF HP OIL LINES IN BOTH MAIN AND SUB PROGRAMS, CHECK OFF AS VERIFIED</b>	
	<b>LINE</b>	<b>COLOR CODE</b>
16	M204 On (Main)	YELLOW
17	M205 Off (Main)	
18	M206 On (Main)	GREEN
19	M207 Off (Main)	
20	M208On (Main)	BLUE
21	M209Off (Main)	
22	M210 On (Main)	ORANGE
23	M211 Off (Main)	

24	<b>LINE</b>	<b>Color Code</b>	<b>VERIFIED BY</b>
24	M212 On (Main)	Red	
25	M213 Off (Main)		
26	M214 On (Main)	PURPLE	
27	M215 Off (Main)		
28	M216 On (Main)	GREY	
29	M217 Off (Main)		
30	M218 On (Main)	BLACK	
31	M219 Off (Main)		
32	M204 On (Sub)	YELLOW	
33	M205 Off (Sub)		
34	M206 On (Sub)	GREEN	
35	M207 Off (Sub)		
36	M208On (Sub)	BLUE	
37	M209Off (Sub)		
38	M210 On (Sub)	ORANGE	
39	M211 Off (Sub)		
40	M212 On (Sub)	RED	
41	M213 Off (Sub)		
42	M214 On (Sub)	PURPLE	
43	M215 Off (Sub)		
44	M216 On (Sub)	GREY	
45	M217 Off (Sub)		
46	M218 On (Sub)	BLACK	
47	M219 Off (sub)		

**FOLLOWING INSTALLATION THE FOLLOWING CHECKLIST MUST BE COMPLETED PRIOR TO PLACING THE HP COOL TECH, INC. HIGH PRESSURE PUMP INTO SERVICE. CHECK FOR / RESOLVE LEAKS THROUGHOUT TESTING.**

#	TEST FUNCTION	VERIFIED BY	
1	Fan Rotation		
2	Motor Rotation		
3	Bag filter in place, cover secured		
4	All lines properly connected		
5	Check for leaks, resolve as needed		
6	MAIN SPINDLE- MDI mode Program: #1132=1000 EOB M218 EOB CYCLE START verify through sub spindle coolant is operational, check for leaks		
7	With coolant running, slowly open spindle door, verify high pressure pump shuts off. Repeat process with main door.		
8	MAIN SPINDLE- MDI mode Program: #1132=1000 EOB M218; EOB CYCLE START shut off coolant flow at operator panel, verify pump stops		
9	1. Flood Coolant Pump OFF 2. Cycle start High Pressure Pump (M218) 3. Verify the control generates M code finish error after time out		
10	Verify the high pressure pump shuts off along with the flood coolant via the following commands: 1. M9 (MDI Mode) 2. -Coolant off- hard key		
11	Verify the high pressure pump shuts off when RESET hard key is depressed.		
12	In Automatic Mode, with either door OPEN: -Verify machine will not cycle -Verify door must be closed and RESET hard key is pressed before machine will cycle		
13	With high pressure pump ON, depress E-STOP hard key, verify high pressure pump turns off		
14	<b>REPEAT STEPS 6 THRU 13 WITH SUB SPINDLE</b>		
15	<b>VERIFY FUNCTION OF HP OIL LINES IN BOTH MAIN AND SUB PROGRAMS, CHECK OFF AS VERIFIED</b>		
	<b>LINE</b>	<b>COLOR CODE</b>	<b>VERIFIED BY</b>
16	M204 On (Main)	YELLOW	
17	M205 Off (Main)		
18	M206 On (Main)	GREEN	
19	M207 Off (Main)		
20	M208On (Main)	BLUE	
21	M209Off (Main)		
22	M210 On (Main)	ORANGE	
23	M211 Off (Main)		

24	<b>LINE</b>	<b>Color Code</b>	<b>VERIFIED BY</b>
24	M212 On (Main)	Red	
25	M213 Off (Main)		
26	M214 On (Main)	PURPLE	
27	M215 Off (Main)		
28	M216 On (Main)	GREY	
29	M217 Off (Main)		
30	M218 On (Main)	BLACK	
31	M219 Off (Main)		
32	M204 On (Sub)	YELLOW	
33	M205 Off (Sub)		
34	M206 On (Sub)	GREEN	
35	M207 Off (Sub)		
36	M208On (Sub)	BLUE	
37	M209Off (Sub)		
38	M210 On (Sub)	ORANGE	
39	M211 Off (Sub)		
40	M212 On (Sub)	RED	
41	M213 Off (Sub)		
42	M214 On (Sub)	PURPLE	
43	M215 Off (Sub)		
44	M216 On (Sub)	GREY	
45	M217 Off (Sub)		
46	M218 On (Sub)	BLACK	
47	M219 Off (sub)		

## High Pressure Coolant Lines

M Code	Color Code	Tool
M204 On	<b>YELLOW</b>	
M205 Off		
M206 On	<b>GREEN</b>	
M207 Off		
M208On	<b>BLUE</b>	
M209Off		
M210 On	<b>ORANGE</b>	
M211 Off		
M212 On	<b>RED</b>	
M213 Off		
M214 On	<b>PURPLE</b>	
M215 Off		
M216 On	<b>GRAY</b>	
M217 Off		
M218 On	<b>BLACK</b>	
M219 Off		


**OPERATOR NOTES:**

