| YORK® A JOHNSON CONTROLS COMPANY | Form Number: 160.55-O1 (LS02) | 606 |
|---|---|---|
| | Supersedes: None | |
| **LITERATURE SUPPLEMENT** | File with: 160.55-M1 (704), 160.55-O1 (604) | |
| Subject: YT Software Enhancements | | |

## GENERAL

Beginning June 2006, enhanced software will be supplied in new production YT chillers. It is backward compatible to all previous YT chillers equipped with microboard 031-02430-000 or 031-02430-001. The enhancements are outlined below.

The versions and part numbers are:
**Microboards 031-02430-000 and 031-02430-001**

- NEMA 1-4 and CE chillers C.OPT.02.09.008 (031-02469-001)

## MEDIUM VOLTAGE SOLID STATE STARTER

This software version is necessary for Medium Voltage Solid State Starter applications. On the SETUP Screen, select "MV SSS" for Motor Type when this device is present.

**575V/60Hz Variable Speed Drive**
This software version is necessary for 575V/60Hz VSD applications.

The following Cycling shutdowns apply to 575V/60HZ VSD:

"VSD-PRECHARGE-LOW DC BUS VOLTAGE"
If the DC Link voltage does not reach at least 60VDC (within 4 seconds) or at least 600VDC (within 20 seconds) after the precharge command has been received, this shutdown is performed.

"VSD—PRECHARGE-DC BUS VOLTAGE IMBALANCE"
If the Half DC Link voltage does not remain within ± 106VDC of the DC Link Voltage divided by 2 during the pre-charge interval, this shutdown is performed.

"VSD-LOW DC BUS VOLTAGE"
If the DC Link Voltage falls below 600VDC while running, this shutdown is performed.

"VSD-DC BUS VOLTAGE IMBALANCE"
If the Half DC Link Voltage does not remain within ± 106VDC of the DC Link Voltage divided by 2 while running, this shutdown is performed.

"VSD-HARMONIC FILTER-PRECHARGE-LOW DC BUS VOLTAGE"
If the DC Link voltage does not reach at least 60VDC (within 100 millisconds) or at least 630VDC (within 5 seconds) after the filter precharge command has been received, this shutdown is performed.

"VSD-HARMONIC FILTER-DC BUS VOLTAGE IMBALANCE"
If the Half DC Link Voltage does not remain within ± 63 VDC of the DC Link Voltage divided by 2, this shutdown is performed.

The following safety shutdowns apply to 575v/60Hz VSD:

"VSD-HARMONIC FILTER-HIGH BASEPLATE TEMPERATURE"
If the Baseplate temperature rises above the following limits, this shutdown is performed:

424HP – 70.0° F, 174.2° C
608HP – 88.0° F, 190.4° C

**CONDENSER REFRIGERANT LEVEL CONTROL**

In previous software versions, all of the control thresholds were programmable. In this version, some control thresholds are fixed while others are programmable as shown below. This provides more stable control in certain operating conditions. The control thresholds are applied in two different zones, as determined by the error relationship between the actual refrigerant level and the Level Setpoint as shown below. Zone 1 parameters are used when the error is ≤ 9%. Zone 2 parameters are used when the error is >9%. When transitioning from Zone 2 to Zone 1, the error must be ≤ 9% for 60 seconds before the Zone 1 parameters are used. If the error is > 9%, the Zone 2 parameters are immediately implemented.

On the Refrigerant Level Control Screen, the Zone Control State status box displays which zone of control is being used: "Zone 1", "Zone 2", "Zone Control Off" (if chiller shutdown). When transitioning from Zone 2 to Zone 1, "Zone 2 to Zone 1" is displayed and the "Zone Control Time Remaining" status box displays the amount of time remaining in the 60-second countdown timer.

The following are the control thresholds now used for Refrigerant Level Control:

| | Zone 1 | Zone 2 |
|---|---|---|
| Proportion Limit Open (fixed) | 50% | 52% |
| Proportion Limit Close (fixed) | 45% | 45% |
| Rate Limit (setpoint) | 3% to 15%; default 7% | 3% to 15%; default 5% |
| Period (setpoint) (seconds) | 8 to 22; default 15 | 2.5 to 10; default 2.5 |

| | Zone 1 and Zone 2 |
|---|---|
| Level Setpoint | 20% to 80%; default 30% |
| Valve Preset Time (setpoint) (seconds) | 0 to 100; default 0 |
| Ramp Up Time (setpoint) (minutes) | 3 to 15; default 8 |
| Proportion Error Deadband - ±0% | |
| Rate Error Deadband – ±0% | |

All of these setpoints function the same as in previous software versions as explained in YORK Service Manual 160.55-M1. However, there is now a single RATE LIMIT setpoint that replaces both the previous RATE LIMIT OPEN and RATE LIMIT CLOSE setpoints. This new RATE LIMIT setpoint sets the Rate Limit threshold for refrigerant levels both above (open) and below (close) the Refrigerant Level Setpoint.

All of the Refrigerant Level Control setpoints are now entered on the Refrigerant Level Control Screen (fig 1).

Use the following procedure to enter the setpoints:

1. At the keypad, login at service access level using access code 1 3 8 0.
2. Select the refrigerant level control screen from the condenser screen.
3. Press the appropriate key to select the setpoint to be programmed.
   (If selecting period or rate setpoint, press the set zones key. A green box appears around the first changeable setpoint. Use the ▲, ▼, ◄, ► keys to place the green box around the desired setpoint to be changed. Press ENTER (√) key. A dialog box will appear with the range of settings)
6. Using the numeric keypad keys, enter the desired value.
7. Press ENTER (√) key.

## THERMAL FLOW SENSORS

This software allows the use of either paddle-type flow sensors or thermal flow sensors (p/n 025-38145-001) on the evaporator and condenser. The thermal flow switches are electronic sensors. The operating principle of the sensor is thermal conductivity. It uses the cooling effect of a flowing liquid to sense flow. The temperature of the heated sensor tip is sensed by a thermistor located in the tip. A second thermistor, located higher in the tip in a non-heated area, is only affected by changes in liquid temperature. The temperatures sensed by the thermistors are compared. Flowing liquid carries heat away from the heated sensor tip, lowering its temperature. The higher the flow rate, the lower the tip temperature and therefore a lower differential between thermistors. Lower flow rates remove less heat from the tip allowing a higher tip temperature. The lower the flow, the greater the differential between thermistors. The sensor is vendor-calibrated to turn on its output at a flow rate of 20cm(0.6 ft.)/second. This is the setpoint. There are 11 LED's on the sensor that reflect the measured flow rate. The center located amber LED illuminates at the setpoint flow rate (and above). The 4 LED's to the left of the amber reflect flow rates below the setpoint. The 6 LED's to the right of the amber reflect flow rates above the setpoint. As the flow rate decreases from the setpoint, the LED display moves to the left. As the flow rate increases above the setpoint, the LED display moves to the right. The sensor operates from a 24Vac power source and has a solid state relay output. On each sensor, one side of the solid state relay output (pin 4) is connected to the microboard +5Vdc and the other side (pin 2) is Connected to a microboard analog input. After power is applied, there is a thermal warm-up period of up to 20 seconds. During this time, the output could be unstable. When the setpoint (or greater) flow rate is sensed, the solid state relay output is turned on causing it to conduct current through the 7.5K ohm microboard load resistor to the +5vdc. This applies >+4Vdc to the microboard input (evaporator J7-14; condenser J7-16). When a flow rate less than the setpoint is sensed, the solid state relay output is turned off, resulting in no conduction through the load resistor. This applies <1Vdc to the microboard input. To determine the state of the solid state relay, first confirm that +5vdc is present at pin 4 of the flow sensor. Then connect a voltmeter from Microboard J7-14 (evaporator) or J7-16 (condenser) to microboard TP1(ground).

The power source is connected to the sensor as follows:

| From | To |
|---|---|
| Sensor pin 1 | TB1-162 (24Vac) |
| Pin 3 | TB6-5 (Gnd) |

The sensor outputs are connected to the Microboard as follows:

| | From | To |
|---|---|---|
| Evaporator: | Sensor pin 4 | Microboard J7-15 (+5Vdc) |
| | pin 2 | J7-14 (sensor output) |
| Condenser: | Sensor pin 4 | J7-17 (+5Vdc) |
| | Pin 2 | J7-16 (sensor output) |

Microboard Program Jumpers JP21 and JP22 must be placed on pins 1 and 2.

This software version allows either the Thermal-Type sensors connected to the Microboard analog inputs or the Paddle-Type sensor connected to the I/O Board digital inputs. For the program to read the correct input for the flow sensor type that is present, the actual sensor type used must be entered on the OPERATIONS Screen using the FLOW SWITCH SETPOINT as follows:

Flow Switch Setpoint

In order for the program to read the appropriate inputs for the flow sensor status, the actual sensor type used must be entered on the OPERATIONS screen. The selections are "Analog" (thermal-type) or "Digital" (paddle-type). If Analog is selected, the program reads the thermal-type flow sensor inputs at Microboard analog inputs J7-14 (evaporator) and J7-16 (condenser) and ignores the Digital inputs. If Digital is selected, the program reads the paddle-type sensor inputs at the I/O Board digital inputs TB4-12 (evaporator) and TB4-11 (condenser) and ignores the analog inputs.

Enter the applicable flow sensor type as follows:

1. Select SETPOINTS/SETUP/OPERATIONS Screen.
2. Press FLOW SWITCH key.
3. Use ◄ or ► keys to select sensor type. Each time the key is pressed, Analog or Digital is alternately displayed.
4. Press ENTER (√) key.

**Motor Lubrication Notification**
This feature is intended to provide an indication when the compressor motor lubrication is required. The lubrication requirement and notification is based on the "Operating Hours Since Last Motor Lubrication".

There are up to three levels of notification, each indicating an increasing level of urgency. "Warning – Motor Bearing Lube Suggested" is displayed when the hours exceed 1000 hours. If there is no response, "Warning – Motor Bearing Lube Required" is displayed when the hours exceed 1200 hours. If there is still no response, a safety shutdown is performed when the hours exceed 1400 hours and "Motor – Lack of Bearing Lubrication" is displayed.

To provide a record of when a motor lubrication is performed, the Operator enters his/her initials, name or user ID (minimum 3 characters to maximum of 8 characters) using the Motor Lube Acknowledge key. The date and time of this entry is automatically logged as the Date of Last Lubrication and Time of Last Lubrication. This also clears any motor lubrication warning or safety that is in effect and resets the Operating Hours Since Last Lubrication to zero.

"Warning – Motor Bearing Lube Suggested"
The Operating Hours Since Last Motor Lubrication has exceeded 1000 hours. This will be displayed until manually cleared by the Operator or the Operating Hours Since Last Motor Lubrication exceed 1200 hours, whereupon it is replaced by the message "Warning – Motor Bearing Lube Required" below. The Operator clears this message by entering his/her initials, name or user ID in Operator Access Level (or higher) using the Motor Lube Acknowledge key on the Motor Lubrication Screen. Refer to the Motor Lubrication Screen for entry instructions. The date and time of this entry is automatically logged as the "Date of Last Motor Lubrication" and "Time of Last Motor Lubrication". It also resets the "Operating Hours Since Last Lubrication" to zero. The date this warning occurs is stored as the "Date of Last Motor Lubrication Warning or Fault"

"Warning – Motor Bearing Lube Required"
The Operating Hours Since Last Motor Lubrication has exceeded 1200 hours. This replaces "Warning – Motor Bearing Lube Suggested" above. This is displayed until manually cleared by the Operator or the Operating Hours Since Last Motor Lubrication exceed 1400 hours, whereupon it is replaced by the message "Motor – Lack of Bearing Lubrication" below. The Operator clears this message by entering his/her initials, name or user ID in Operator Access Level (or higher) using the Motor Lube Acknowledge key on the Motor Lubrication Screen. Refer to the Motor Lubrication Screen for entry instructions. The date and time of this entry is automatically logged as the "Date of Last Motor Lubrication" and "Time of Last Motor Lubrication". It also resets the "Operating Hours Since Last Lubrication" to zero. The date this warning occurs is stored as the "Date of Last Motor Lubrication Warning or Fault"

"Motor – Lack of Bearing Lubrication"
The Operating Hours Since Last Motor Lubrication has exceeded 1400 hours. This message replaces "Warning – Motor Bearing Lube Required" above. This safety shutdown remains in effect until the Operator places the COMPRESSOR Switch in the Stop-reset (O) position and enters his/her initials, name or user ID in Operator Access Level (or higher) using the Motor Lube Acknowledge key on the Motor Lubrication Screen. Refer to the Motor Lubrication Screen for entry instructions. The date and time of this entry is automatically logged as the "Date of Last Motor Lubrication" and "Time of Last Motor Lubrication". It also resets the "Operating Hours Since Last Lubrication" to zero. The date this warning occurs is stored as the "Date of Last Motor Lubrication Warning or Fault"

The Motor Lubrication Screen (Fig 2), accessible from the Motor Screen in any access level, displays information applicable to this feature.

# REFRIGERANT LEVEL CONTROL SCREEN

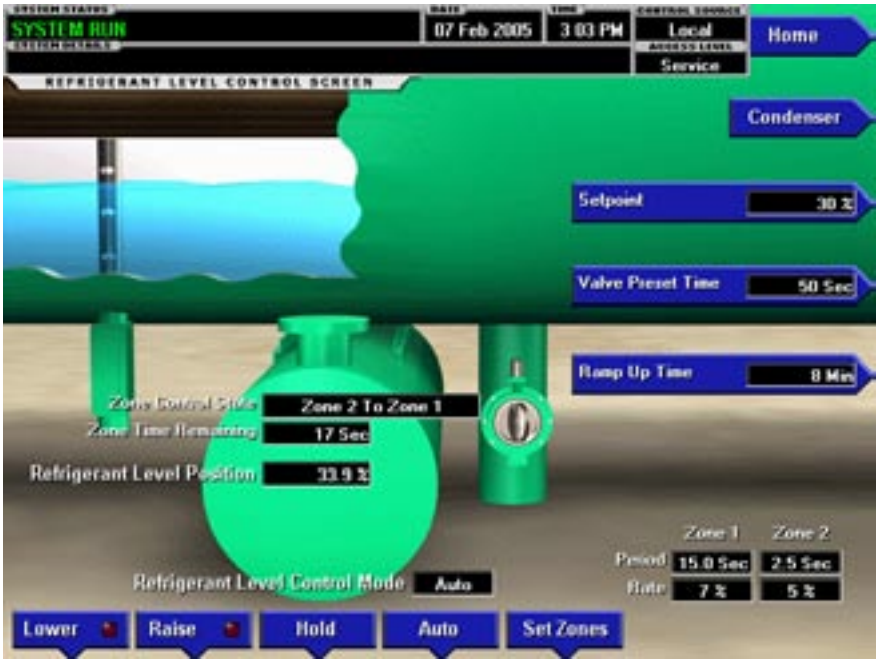


**FIG. 1** 50067

## OVERVIEW

This screen displays a cutaway view of the chiller condenser, along with the liquid refrigerant level sensor and variable orifice. Setpoints relating to the liquid level control are maintained on this screen. Through animation, the variable orifice position is displayed. Also, the refrigerant flow control valve (variable orifice) can be manually operated.

A Variable Orifice is used to control the condenser refrigerant level to the Refrigerant Level Setpoint. The control thresholds are applied in two different zones, as determined by the error relationship between the actual refrigerant level and the Level Setpoint. Zone 1 parameters are used when the error is less than or equal to 9%. Zone 2 parameters are used when the error is greater than 9%. When transitioning from Zone 2 to Zone 1, the error must be less than or equal to 9% for 60 seconds before the Zone 1 parameters are used. If the error is greater than 9%, the Zone 2 parameters are immediately implemented.

NOTE

***Requires login access level of SERVICE. Service technicians refer to YORK Service Manual 160.55-M1 for operation instructions and explanations of all programmable Setpoints, Zone parameters and displayed values.***

## DISPLAY ONLY

**Refrigerant Level Position**
Displays the present level of the liquid level control. The refrigerant level is animated in the cutaway view of the condenser. When the actual level is 0% to 15%, the level is shown about 50% full. When the actual level is 16% to 31%, the level is shown about 60% full. When the actual level is 32% to 47%, the level is shown about 70% full. When the actual level is 48% to 63%, the level is shown about 80% full. When the actual level is 64% to 79%, the level is shown as about 90% full. Actual levels above 79% shown as 100% full.

**Refrigerant Level Control Mode**
Indicates whether the liquid level control is under manual or automatic control.

**Raise** (LED)
ON when the digital output controlling the raise output is ON. Otherwise, it is OFF.

**Lower** (LED)
ON when the digital output controlling the Lower output is ON. Otherwise, it is OFF.

**Zone Control State**
Displays the zone control state ("Zone 1", "Zone 2", or "Zone 2 to Zone 1") currently in effect for the Refrigerant Level control. "Zone Control Off" is displayed when the chiller is shutdown.

**Zone Time Remaining**
Displays the time remaining in the 60 second countdown timer when transitioning from Zone 2 to Zone 1. When transitioning from Zone 2 parameter set to Zone 1 parameter set, the Zone 1 error requirement must be met for 60 continuous seconds before Zone 1 parameters are used.

**Refrigerant Level Target**
After the chiller has been running for 3 minutes, if the refrigerant level is less than the Level Setpoint, a linearly increasing ramp (Refrigerant Level target) is applied to the Level Setpoint. This ramp allows the level to go from the present level to the programmed Level Setpoint over a period of time programmed as the Ramp Up Time.

**Ramp Up Time Remaining**
Displays the time remaining in the Ramp Up time countdown timer while a Refrigerant Level target ramp is in effect.

## PROGRAMMABLE

**Setpoint**
Specifies the desired refrigerant level to be maintained in the condenser.

**Valve Preset Time**
Specifies the duration of pre-positioning (close) pulse during the System Pre-lube when starting the chiller.

**Ramp Up Time**
Specifies the duration of the ramp up time applied to the Refrigerant Level Target when starting the chiller while the actual refrigerant level is less than the level setpoint after a 3 minute bypass at start.

**Period** (Zone 1)
Specifies the control period used during Zone 1 operation.

**Rate** (Zone 1)
Specifies the rate limit threshold used during Zone 1 operation.

**Period** (Zone 2)
Specifies the control period used in Zone 2 operation.

**Rate** (Zone 2)
Specifies the rate limit threshold used during Zone 2 operation.

**[Refrigerant Level Control] Lower (Manual)**
This key puts the Level Control into manual mode and sends a lower (open) command to the variable orifice.

**[Refrigerant Level Control] Raise (Manual)**
This key puts the Level Control into manual mode and sends a raise (close) command to the variable orifice.

**[Refrigerant Level Control] Hold (Manual)**
This key puts the Level Control into manual mode and sends a hold command to the variable orifice

**[Refrigerant Level Control] Auto**
Returns the Level Control to automatic mode.

## NAVIGATION

**Home**
*Access Level Required:* VIEW
Causes an instant return to the Home Screen

**Condenser**
*Access Level Required:* VIEW
Returns to the Condenser Screen

# MOTOR LUBRICATION SCREEN

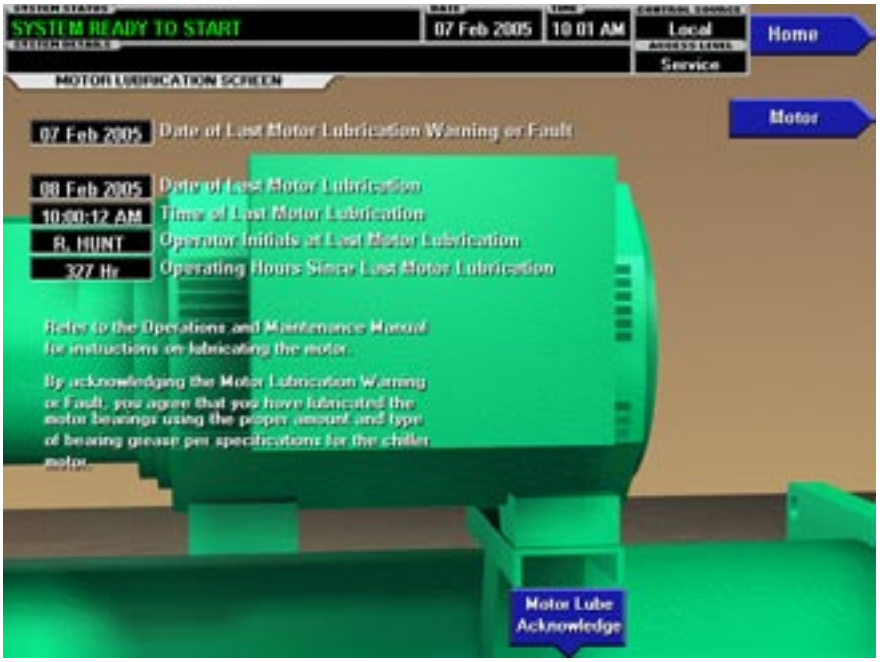


FIG. 2

50066

## OVERVIEW

This feature provides an indication when the compressor motor lubrication is required. The lubrication requirement and notification is based on the "Operating Hours Since Last Motor Lubrication". There are up to three levels of notification, each indicating an increasing level of urgency. "Warning – Motor Bearing Lube Suggested" is displayed when the hours exceed 1000 hours. If there is no response, "Warning – Motor Bearing Lube Required" is displayed when the hours exceed 1200 hours. If there is still no response, a safety shutdown is performed when the hours exceed 1400 hours and "Motor – Lack of Bearing Lubrication" is displayed. Refer to Display Messages section of this book for details of these messages.

To provide a record of when a motor lubrication is performed, the Operator enters his/her initials, name or user ID using the Motor Lube Acknowledge key. The date and time of this entry is automatically logged as the Date of Last Lubrication and Time of Last Lubrication. This also clears any motor lubrication warning or safety that is in effect and resets the Operating Hours Since Last Lubrication to zero.

## DISPLAY ONLY

**Date of Last Motor Lubrication Warning or Fault**
Displays the date of the last motor lubrication warning or safety shutdown.

**Date of Last Motor Lubrication**
Displays the date of the last motor lubrication. This parameter is automatically recorded when the Operator enters his/her initials, name or user ID using the Motor Lube Acknowledge key.

**Time of Last Motor Lubrication**
Displays the time of the last motor lubrication. This parameter is automatically recorded when the Operator enters his/her initials, name or user ID using the Motor Lube Acknowledge key.

**Operator Initials at Last Motor Lubrication**
Displays the initials, name or user ID entered by the Operator when the motor lubrication is performed. Entered as a 3 to 8 character string using the Motor Lube Acknowledge key.

**Operating Hours Since Last Motor Lubrication**
Displays the run hours (in whole hours) accumulated since the last motor lubrication. The value is reset to zero whenever the Operating Hours (on the Operations

Screen) is reset to zero or whenever the Operator enters his/her initials, name or user ID using the Motor Lube Acknowledge key.

## PROGRAMMABLE

**Motor Lube Acknowledge**
*Access Level Required:* OPERATOR
When the motor lubrication has been performed, the Operator must acknowledge the lubrication has been performed. This is done by entering his/her initials, name or user ID as a 3 to 8 character string. The entry is displayed as the Operator Initials at Last Lubrication. The date and time of this entry is automatically logged as the Date of Last Motor Lubrication and Time of Last Motor Lubrication. This entry also resets the Operating Hours Since Last Lubrication to zero.

This entry also resets the motor lubrication warning messages: "Warning – Motor Bearing Lube Suggested", "Warning – Motor Bearing Lube Required" and safety shutdown "Motor – Lack of Bearing Lubrication".

Enter your initials, name or user ID using the following procedure. The entry must be a minimum of 3 characters and a maximum of 8 characters.

1. At the keypad, log in at OPERATOR access level using Password 9 6 7 5. If resetting the safety shutdown "Motor – Lack of Lubrication", place COMPRESSOR switch in Stop-reset (O) position.
2. Press the Motor Lube Acknowledge key on the Motor Lubrication Screen. A dialog box appears. A red box highlights the first changeable location.
3. Use the ▲▼keys to scroll sequentially through the alphabet to enter letters or numbers. Each time the ▲ is pressed, the next higher sequential alphabet letter or number is displayed. Each time the ▼is pressed, the next lower alphabet letter or number is displayed. When the desired letter or number is displayed, use the ► key to forward space the red box for the next entry. Use the ◄ key to backspace, if necessary. To write over an existing entry or to place a blank space, scroll to the beginning of the alphabet. The selection prior to the letter A is a blank space. Use the ● key to enter a period/decimal point. During the entry process, if it is desired to exit the dialog box and retain the previous entry, press the CANCEL (X) key.
4. When all of the desired characters have been entered, press the ENTER (√) key.

**Motor Lube Date**
*Access level required:* ADMIN
Allows modification of the Date of Last Motor Lubrication.

## NAVIGATION

**Home**
*Access Level Required:* VIEW
Causes an instant return to the Home Screen

**Motor**
*Access Level Required:* VIEW
Causes an instant return to the Motor Screen



Form 160.55-O1 (LS02)
New Release