

**MSC-3
LonWorks
Option Board
Instruction Manual**



MSC-3 LonWorks Option

ZENER TECHNOLOGY AND QUALITY ASSURANCE

Since 1978 Zener Electric has supplied many thousands of AC drives to industry. These drives have been installed into numerous applications resulting in a wealth of in house experience. The Zener MSC-3 AC variable speed controller is the culmination of this experience, modern technology and industrial application requirements. The Zener Quality Assurance program ensures that every MSC-3 manufactured has proven to operate correctly in the production test bay before dispatch.

MSC-3 PRODUCT WARRANTY

Zener Electric warrants the MSC-3 against defective workmanship and materials for a period of 24 months from the date of dispatch. Such defects will be rectified free of charge for both labour and material, at Zener Electric's premises subject to:

1. Zener Electric's customer raising an order upon Zener for service and/or repairs, subject to a warranty claim. The order is to state particulars of the model and serial number, the date of original purchase and invoice/delivery docket number.
2. All damage resulting from incorrect installation or use other than in accordance with the instruction manuals issued by Zener Electric is excluded from this warranty.
3. The Warranty being rendered invalid if the product is misused or if any unauthorised alteration, modification or substitution of any part of the product be made or the serial number of the product is defaced or altered.
4. The cost of transportation (both ways) is to be met by the owner if it's necessary to return the product, or any part of it, to Zener Electric's premises.
5. A charge being accepted by the owner for travelling time and expenses incurred in connection with warranty service at the user's site as requested by the owner.
6. If the product was not purchased from Zener Electric directly, then a warranty claim must be lodged with the original supplier in the first instance. Repairs will not be effected by Zener Electric unless approved by the original supplier. Goods not of our own manufacture incorporated in our supply or sold by us, carry their maker's warranty only.
7. Goods returned for claim under warranty will be accepted on the condition that should the claim be rejected then all costs, including inspection, will be charged to the customer's account.
8. Zener Electric is not liable for any consequential loss.

SAFETY

Your MSC-3 must be applied, installed and operated in a safe manner. It is the responsibility of the user to ensure compliance with all regulations and practices covering the installation and wiring of your MSC-3. The instruction manual should be completely read and understood before attempting to connect or operate the MSC-3. Only skilled personnel should install this equipment.

THE CONTENTS OF THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE

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MSC-3 LonWorks Option

Introduction

This manual describes the installation, features and operations of the **MSC-3** communication option. The features of this option include:

LonWorks / LonMark compliant communications protocol

- Free Topology Twisted Pair technology
- Application layer adherence: “LonMark Application-Layer Interoperability Guidelines Version 3.3
- LonMark Variable Speed Drive Functional Profile 6010 Version 1.1
- Supplementary network variables for additional functionality.
- Safe Wink and Service push button features implemented on the drives console.

Extra speed preset

- For more convenient use with communications
- Allows all of the existing presets to be used

Fault Log

- Saves the last 10 faults, with time / date stamp
- A fault mask, enabled or disabled by the user to filter out power fail / under voltage events to avoid filling the log. The user can clear the log.
- Viewable fault log

Kilowatt-hour meter

- Non volatile storage
- Available for display as a run mode variable
- Can be reset

Hours run meter

- Non volatile storage
- Available for display as a run mode variable
- Can be reset

Essential services operation (ESO) log

- With supplementary information of ESO activation and drive stress in ESO operation (i.e. trips ignored)

Real time clock.

- Battery backup
- Set Date/Time
- Used to Date/Timestamp log entries

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Compatibility

This manual describes the features of the LONWORKS Protocol option with software version 1.04 and is compatible with:

- ShortStack Micro Server Version 2.0 (compliant to LonMark Layer 1-6 Interoperability guidelines Version 3.3)
- LonMark Application-Layer (Layer 7) Interoperability Guidelines (Version 3.3)
- LonMark Functional Profile: Variable Speed Motor Drive (6010 Version 1.1)
- LonMark Functional Profile: Analog Input (0520 Version 1.0)
- LonMaker Network Tool (Version 3.1)
- MSC-3 Control Board Software (Version 1.51 or later).
- MSC-3 Extended Features Card Software (Version 1.19 or later).
- MSC-3 External interface file MSC-3V104.XIF.
- FTT-10A transceivers

MSC-3 LonWorks Option

Installation

WARNING!



Read all operating instructions before installing, wiring, operating, servicing or inspecting the MSC-3.

Ensure that the instruction manual is made available to the final user of the product as well as all personnel involved in any aspect of installation, adjustment or maintenance.

Your MSC-3 must be applied and installed by a suitably qualified and experienced electrical tradesperson in accordance with this manual, good engineering practice and all local rules and regulations



There are hazardous voltages inside the MSC-3 whenever it is connected to an electrical supply and for some time after disconnection.

Before touching anything inside the MSC-3 enclosure or other equipment connected to the MSC-3 terminals, disconnect all sources of electrical power, wait at least 15 minutes for capacitors within the MSC-3 to discharge to less than 50VDC and then ensure, by measurement, that there is no hazardous AC or DC voltage present at any terminal.

IP30 Chassis A Installation

1. Ensure all power sources have been removed for at least 15 minutes and that they remain that way for the rest of the installation.
2. Remove the bottom section of the MSC-3 blue plastic moulding to reveal the power terminals.
3. Remove the screw holding the control board/display assembly and pull it off the drive.
4. Turn the control board/display assembly over and plug the Option Board into one of the available option connectors.
5. Lay the Mylar insulation sheet on top off the exposed metal work and replace the control board/display/option assembly.
6. Replace the original mounting screw and install the Option Board mounting screw. The Option Board is ready for control wiring. Refer to the wiring diagram for wiring examples.
7. Once control wiring is complete replace the bottom moulding.

IP 66 Chassis A Installation and all other chassis

1. Ensure all power sources have been removed for at least 15 minutes and that they remain that way for the rest of the installation.
2. Open the front door and remove the screws securing the control board to the chassis and lift off the control board.
3. Turn the control board over and plug the Option Board into one of the available option connectors.
4. Lay the Mylar insulation sheet on top off the exposed metal work and replace the control board/option assembly.
5. Replace the mounting screws. The Option Board is ready for control wiring. Refer to the wiring diagram for wiring examples.
6. Once control wiring is complete close the front door.

Battery Replacement

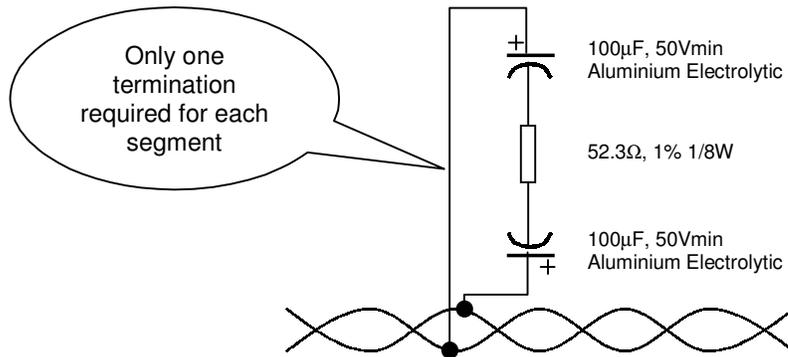
The battery used for time keeping is a **CR2032 3V Lithium** type. To replace the battery follow the first few steps of the installation section above to access the option board. Replace the old battery. Reassemble the drive as described in the installation section above.

MSC-3 LonWorks Option

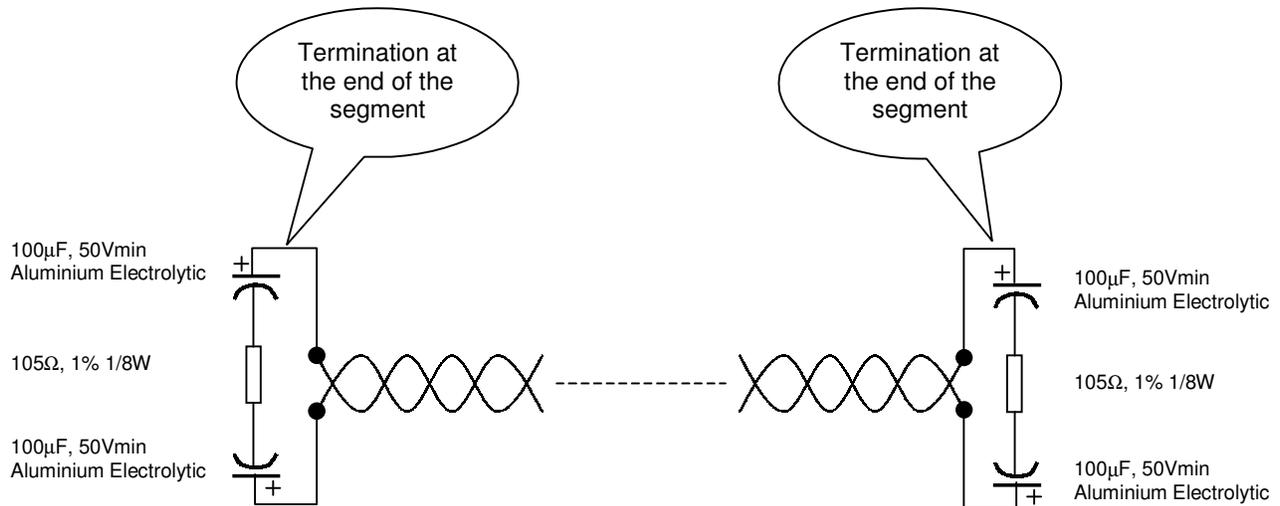
Network Wiring Precautions

The following precautions will help to minimise the risk of network errors and/or failures. These precautions include:

- Communications cabling and terminations as recommended by Echelon for FTT-10A transceivers (refer to "LonWorks FTT-10A Free Topology Transceiver Users Guide", Echelon document reference 078-0156-01G). Briefly, for a free topology segment, a single termination may be located anywhere on the segment and is given in the following diagram:

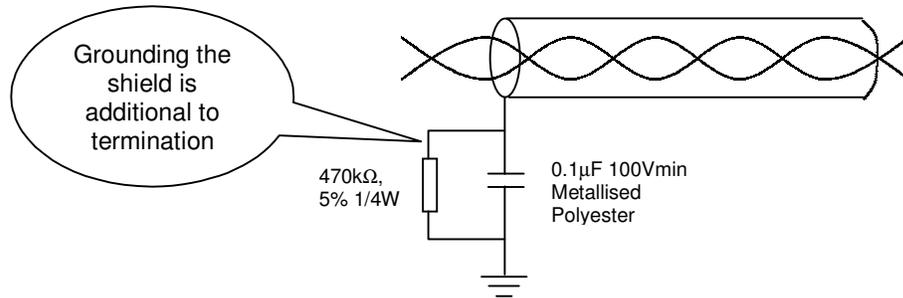


For a bus topology, a double termination may be of benefit. This is shown in the following diagram:

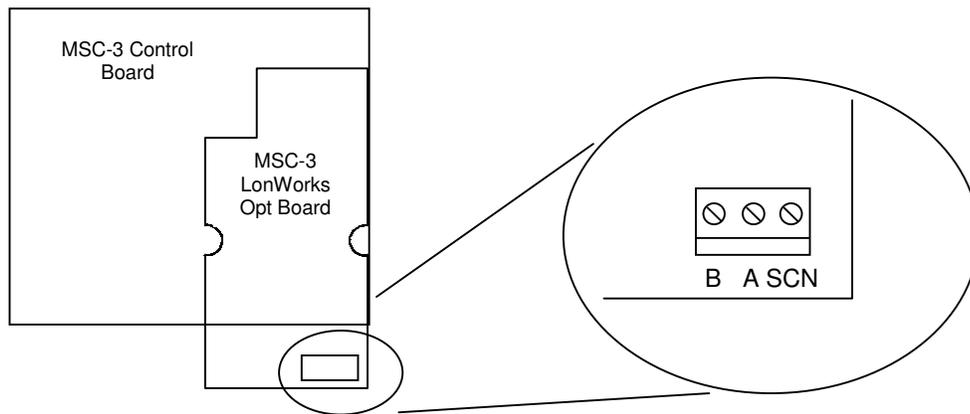


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- The use of shielded twisted pair cable will also help to reduce the risk of failures. This termination is provided for on the LonWorks option card. The diagram below shows the components of the shield termination and may be useful for other equipment connected to the network:



- The MSC-3 LonWorks option has these components built in. Connecting the cable shield to the SCN terminal will terminate it as required. The diagram below shows the location of the twisted pair and shield terminals. Note that earlier hardware revisions (prior to revision C) may not have the SCN terminal. In these installations a separate terminal is provided.



- Avoid laying communication cables adjacent to power cabling and wiring. If not possible utilise the best separation of communication cabling and power cabling.
- If possible communication cables should cross power cables at right angles to each other.

MSC-3 LonWorks Option

Communications Setup

The **K00 COMMS SETUP** menu lists various aspects for drive commissioning. Use the features in this menu together with your network management tool to add the MSC-3 to your LonWorks network.

K00 COMMS SETUP

Menu Location: First menu

Choices: K29 SERVICE p.b.
 K30 Manuf. Reset
 K31 AI setup
 K45 Max send time
 K46 Min out time
 K47 Terminal Run

K29 SERVICE p.b.

Menu Location: K00 COMMS SETUP

This menu replicates the service push button operation through the console avoiding the need to open the drive to push the service button.

WARNING! Hazardous voltages internal to the MSC-3 exist with power applied. **DO NOT** remove covers or enclosure panels to gain access to the Service push button whilst power is applied. Service push button functions are replicated on the display console.

Press the Enter (↵) push button on the console. The message "**K25 continue ?**" appears on the second line. Confirm your action by pressing Enter (↵) once again and a Service push button operation will be performed.

K30 Manuf. Reset

Menu Location: K00 COMMS SETUP

This menu allows for the recovery of the MSC-3 LonWorks node when it has been sent to an unknown state. The operation will restore the application and initialise the node to the unconfigured state.

Press the Enter (↵) push button (↵) on the console. The message "**K25 continue ?**" appears on the second line. Confirm your action by pressing Enter (↵) once again and the LonWorks node will be restored to the state it was in at the time of installation.

MSC-3 LonWorks Option

K31 AI setup

Menu Location: K00 COMMS SETUP

Choices: K32 AI 1 type
K33 AI 2 type
K34 AI 3 type
K35 AI 4 type

The LonWorks option adds a further four analogue Inputs. Each input can be set to accept either 0...5V or 4...20mA. The desired operation will require the input circuits to be configured for the signal type. Also, the applications' setting within the node must be set accordingly.

K32 AI 1 type

K32 AI 2 type

K32 AI 3 type

K32 AI 4 type

Menu Location: K30 AI setup

Choices: K36 0..5Volt (default),
K37 0..20mA

Use the Up (▲) and Down (▼) push buttons to select the input you intend to use and press Enter (↵). Choose the signal type and press Enter (↵). Also, the input circuits must be configured to accept this signal type. The table below lists the switch setting required for each signal type.

Input	0...5V Signal type	4...20mA Signal type
IN1	Switch 1 open	Switch 1 closed
IN2	Switch 2 open	Switch 2 closed
IN3	Switch 3 open	Switch 3 closed
IN4	Switch 4 open	Switch 4 closed

K45 Max send time

Menu Location: K00 COMMS SETUP

Range: 0.0 to 3276.7 secs

Default value: 0.0

This menu provides an alternate way of confirming or setting the **nciSendHrtBt** (send heart beat) configuration variable of the LonMark 6010 Variable Speed Drive profile. For most of the output network variables defined within the MSC-3s' LonWorks node, there exists a timer that is restarted whenever the variable is propagated to the network. If the timer should reach this value, the associated output variable will be retransmitted.

Use the Up (▲) and Down (▼) push buttons to adjust this value. Use the Enter (↵) push button to accept this value or press Escape (ESC) to abandon the adjustment.

K46 Min out time

Menu Location: K00 COMMS SETUP

Range: 0.0 to 3276.7 secs

Default value: 0.0

This menu provides an alternate way of confirming or setting the **nciMinOutTm** (minium send time) configuration variable of the LonMark 6010 Variable Speed Drive profile. For most of the output network variables defined within the MSC-3s' LonWorks node, there exists a timer that is restarted whenever the variable is propagated to the network. Propagation of the variable is not permitted until the timer has reached or exceeded this value.

Use the Up (▲) and Down (▼) push buttons to adjust this value. Use the Enter (↵) push button to accept this value or press Escape (ESC) to abandon the adjustment.

MSC-3 LonWorks Option

K47 Terminal Run

Menu Location: K00 COMMS SETUP

Available choices: H00 ENABLE (default)
H01 DISABLE

This selection determines the source of the run signals. When enabled, the run signals are sourced from the terminal strip. When disabled the run signals are sourced from the LonWorks network. This selection gives system designers the assurance of knowing which run signals will be obeyed.

Fault Log

The fault log will record the date, time and drive status when a fault or trip occurs. The last 10 faults are recorded. A fault mask is provided to filter out power fail and under volt trips to avoid filling the log with power down trips.

K04 Fault Log

Menu Location: First menu

Choices: K05 View Log
K06 PF/UV Mask
K07 Clear Log

K05 View Log

Menu Location: K04 Fault Log

Display format: top line FF: XXXXXXXXX
bottom line yyyyMMMdd hh:mm

Where:

FF is the fault where 1 is the latest fault and 10 is the oldest.
XXXXXXXXXX fault status code (a '1' indicates the corresponding fault). The digits are read left to right and the corresponding trip is read top to bottom

1	Thermistor over temperature
2	I2t trip
3	Over temperature
4	Supply Fail
5	Power Fail
6	DC Low
7	Over current
8	Over Voltage
9	Output Short Circuit

yyyyMMMdd is the date of the fault
hh:mm is the time of the fault

Use the up and down push buttons to move through the log. Press Enter (↵) or Escape (ESC) to finish viewing the log. To facilitate correct logging, check for correct date and time. See menu K16 DATE/TIME for details.

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K06 PF/UV Mask

Menu Location: K04 Fault Log

Choices: K23 Enabled
 K24 Disabled (initial setting)

The K06 PF/UV Mask when enabled prevents a power fail or under volts trip from making an entry in the fault log. This may be useful in those applications where the power is cycled on and off regularly. Use the up and down push buttons to select enable or disable, press Enter (↵) to accept the displayed setting or Escape (ESC) to abort the change.

K07 Clear Log

Menu Location: K04 Fault Log

This is a two-step sequence to clear the fault log. Press Enter (↵) once and “**K25 continue ?**” is displayed. Press Enter (↵) a second time to clear the fault log or press Escape (ESC) to abort.

Run Log

The run log records motor and drive run time information, such as hours run and kilowatt-hours.

K08 Run log

Menu Location: First menu

Choices: K09 Hours run
 K10 kWh
 K11 Clear Log

K09 Hours run

Menu Location: K08 Run log

Initial value: 0

The number of hours the motor has been running for is recorded in the run log. If the drive is on and the motor has not been running as indicated by the **O00 RUN** relay output, no time is recorded. Press Escape (ESC) to return to the menu. The Hours Run reading is available as a run variable. See the section “Available Run Variables” for details

K10 kWh

Menu Location: K08 Run log

Initial value: 0

The kWh log records the energy used by the motor. Press Escape (ESC) to return to the menu. The kWh reading is available as a run variable. See the section “Available Run Variables” for details

K11 Clear log

Menu Location: K08 Run log

This is a two-step sequence to clear the run log. Press Enter (↵) once and “**K25 continue ?**” is displayed. Press Enter (↵) a second time to clear the run log or press Escape (ESC) to abort.

MSC-3 LonWorks Option

Essential Services Override Log

Supplementary ESO information is recorded by the MSC-3. The date and time of ESO feature activation is recorded as well as the date and time of drive stress (operated beyond design specifications) in ESO mode. Reset of the activation and stressed date and time is security code protected.

K12 ESO log

Menu Location: First menu

Choices: K13 ESO activated
 K14 ESO stressed
 K15 Clear log

K13 ESO activated

Menu Location: K12 ESO log

Display format: top line K13 ESO activated
 bottom line yyyyMMMdd hh:mm

Where:
 yyyyMMMdd is the date of activation
 hh:mm is the time of activation

This menu displays the date and time of the last activation of the ESO feature. Activation is detected when the MSC-3 enters ESO mode operation. Press Escape (ESC) to return to the menu.

K14 ESO stressed

Menu Location: K12 ESO log

Display format: top line K14 ESO stressed
 bottom line yyyyMMMdd hh:mm

Where:
 yyyyMMMdd is the date when the MSC-3 was stressed
 hh:mm is the time when the MSC-3 was stressed

In ESO mode the MSC-3 will ignore any of the following trips: SUPPLY F, I2T TRIP, OT and OT THERM. When this occurs, the MSC-3 and motor is operated beyond design specifications. The date and time of the last occurrence of this event is recorded in the **K14 ESO** stressed menu. Press Escape (ESC) to return to the menu.

K15 Clear log

Menu Location: K12 ESO log

The ESO log is protectively coded against accidental clearing. Press Enter (↵) and MSC-3 waits for the protective code **1472** to be entered. Use the Up (▲) and Down (▼) push buttons to set the code and press Enter (↵) to accept the code and if correct it will clear the ESO log.

MSC-3 LonWorks Option

Time Keeping

There are several features that require a date and time. To support these features time keeping needs to be set with the correct time. Date and time adjustments are done in the K15 Date/Time menu. Press Enter (↵) to begin time adjustment.

K15 Date/Time

Menu Location: First menu

K16 Year

Menu Location: K15 Date/Time

Initial value: 2000

Range: 2000...2099

Use the up and down push buttons to adjust the year. Press Enter (↵) to accept the setting or Escape (ESC) to abort. Pressing Escape (ESC) will abort the adjustment and proceed to the month setting.

K17 Month

Menu Location: K15 Date/Time

Choices: JAN (initial value)	MAY	SEP
FEB	JUN	OCT
MAR	JUL	NOV
APR	AUG	DEC

Use the up and down push buttons to change the month. Press Enter (↵) to accept the setting or Escape (ESC) to abort. Pressing Escape (ESC) will abort the adjustment and proceed to the day adjustment

K18 Day

Menu Location: K15 Date/Time

Initial value: 1

Range: 1..31

Use the up and down push buttons to adjust the day of the month. Press Enter (↵) to accept the setting or Escape (ESC) to abort. Pressing Escape (ESC) will abort the adjustment and proceed to the hour setting.

K19 Hours

Menu Location: K15 Date/Time

Initial value: 0

Range: 0...23

Use the up and down push buttons to adjust the hour. Press Enter (↵) to accept the setting or Escape (ESC) to abort. Pressing Escape (ESC) will abort the adjustment and proceed to the minute setting.

K20 Minutes

Menu Location: K15 Date/Time

Initial value: 0

Range: 0...59

Use the up and down push buttons to adjust the minutes. Press Enter (↵) to accept the setting or Escape (ESC) to abort.

MSC-3 LonWorks Option

Preset Speed

K22 COMMS PRESET

Menu Location: Reference selection list

Range: -100...100 %

The **K22 COMMS PRESET** is an additional speed reference for use with external communications. The default value is entered in manually and is overridden by updates to **nviDrvSpeedStpt** or **nviVSDreference** LonWorks network variables.

Use the Up (▲) and Down (▼) push buttons to adjust the reference between –100% to 100% of the maximum speed. Press Enter (↵) to accept the value or Escape (ESC) to abort.

Note: Adjustment of the **K22 COMMS PRESET** through the console will be remembered after the power has been cycled. This is not the case when accessed by communications.

Relay Output functions

Additional relay functions allow relay logic derived from a LonWorks network to operate any of the MSC-3 relays including those of its options. To use this feature, the relay functions described below must be assigned to the desired relay found in the **G00 INPUT/OUTPUT** menu.

K42 LONDO1

Menu Location: Digital output selection list

Any LonWorks network relay logic that is bound or connected to the **nviVSDDO1** network variable is realised when **K42 LONDO1** is chosen as the relay function. To set up this feature, select the desired relay within the **G00 INPUT/OUTPUT** and use the Up(▲) and Down (▼) push buttons to find **K42 LONDO1**. Press Enter (↵) to select the function. Press Escape (ESC) to abandon the selection.

K43 LONDO2

Menu Location: Digital output selection list

Any LonWorks network relay logic that is bound or connected to the **nviVSDDO2** network variable is realised when **K43 LONDO2** is chosen as the relay function. To set up this feature, select the desired relay within the **G00 INPUT/OUTPUT** and use the Up(▲) and Down (▼) push buttons to find **K43 LONDO2**. Press Enter (↵) to select the function. Press Escape (ESC) to abandon the selection.

MSC-3 LonWorks Option

Run Variables

K09 Hours run

Menu Location: Run variable selection list

Range: 0...65535 hours

Reports the hours run reading on the console when the drive is in the run display mode. This value is available to a LonWorks network via the **nvoDrvRunHours** network variable.

K10 kWh

Menu Location: Run variable selection list

Range: 0...65535 kWh

Reports the kWh reading on the console when the drive is in the run display mode. . This value is available to a LonWorks network via the **nvoVSDkWhr** network variable.

K28 WINK

Menu Location: Run variable selection list

Range: 60...0

The LonWorks WINK feature is implemented as a down counting display on the console when the drive is in the run display mode. When the drive receives a WINK signal from the network, the displayed value is set to 60 and commences counting down to zero to indicate WINK behaviour.

K38 Op AI 1

K39 Op AI 2

K40 Op AI 3

K41 Op AI 4

Menu Location: Run variable selection list

Range: -25.00...100.00 %

These run variables are intended for use as a way of checking the values of the additional analogue inputs. It is important to know the signal type for correct interpretation of the reading. Each of these inputs are available to the LonWorks network. The table below lists associations between inputs and LonWorks network variables.

Input Channel	Network Variable
K38 Op AI 1	nvoVSDLonopAI1
K39 Op AI 2	nvoVSDLonopAI2
K40 Op AI 3	nvoVSDLonopAI3
K41 Op AI 4	nvoVSDLonopAI4

K44 LONAO1

Menu Location: Run variable selection list

Range: -25.00...100.00 %

This run variable is intended for use as a way of checking the value that is sent to the analogue output hardware. It is important to be aware of the signal type for correct interpretation of the reading. An Extended Features option is required to realise this function. A LonWorks network variable that is bound or connected to the **nviVSDAO** network variable is realised when **K44 LONAO1** is chosen as the analogue output function.

To set up this feature, select the **P01 Analog Opt** within the **G00 INPUT/OUTPUT** and use the Up (▲) and Down (▼) push buttons to find **K44 LONAO1**. Press Enter (↵) to select the function. Press Escape (ESC) to abandon the selection.

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MSC-3 - LonWorks Interface

At the time of print, the external interface file for the definition of the MSC-3 is MSC-3V104.XIF. This file is distributed with the LonWorks option or is available from Zener Electric upon request.

The MSC-3 LonWorks option contains network variables and configuration parameters as described by the 6010 Variable Speed Motor Drive functional profile. This profile is available from the LonMark Interoperability Association. There are additional extensions that supplement the variables of the profile. As some network variables and configuration parameters are optional the next two sections list those implemented in MSC-3 LonWorks option. Refer to the profile documentation (6010_11.PDF) for details. The MSC-3 implements additional network variables for convenience.

6010 VSD Profile Variables – Functional Block Inputs.

Variable	LonWorks SNVT	Comments
nviRequest	SNVT_obj_request	LonWorks node object request variable for node control
nviDrvSpeedStpt	SNVT_switch	Run / Stop control and low-resolution speed reference of range 0.5...100.0% of nominal rpm. Network updates to this variable will override K22 COMMS PRESET . <u>Do not use nviVSDrun or nviVSDreference</u> when nviDrvSpeedStpt is in use.

6010 VSD Profile Variables – Functional Block Outputs.

Variable	LonWorks SNVT	Comments
nvoStatus	SNVT_obj_status	LonWorks object status bit field containing: drive activity status (out_of_service), manual control status (manual_control), and alarm status (in_alarm).
nvoDrvSpeed	SNVT_lev_percent	Motor speed with range -100.00...100.00% of Nominal rpm. This variable reflects the value of V02 rpm run variable.
nvoDrvCurnt	SNVT_amp	Motor Current with range 0...3276.6 Amps (drive size dependant). This variable reflects the value of V04 Amps run variable.
nvoDrvVolt	SNVT_volt	Motor Voltage with range 0...3276.6 Volts. This variable reflects the value of V07 Volts AC run variable.
nvoDrvPwr	SNVT_power_kilo	Motor Power with range -3276.8...3276.6 kW. This variable reflects the value of V06 kW run variable.
nvoDrvRunHours	SNVT_time_hour	Drive total running time with range 0...65534 hours. This variable reflects the value of K09 Hours run run variable.

MSC-3 LonWorks Option

6010 VSD Profile Configuration Variables.

Configuration Variable	SCPT Reference	Default	Comments
nciMaxSpeed	SCPTmaxSetpoint	100%	0...100% of nominal rpm
nciMinSpeed	SCPTminSetpoint	0%	0...100% of nominal rpm
nciSndHrtBt	SCPTmaxSendTime	0 secs	0...6553.4 seconds, output heartbeat interval
nciNmISpeed	SCPTnomRPM	1500rpm	0...12000rpm, nominal motor speed. It is important for maximum and minimum speed calculations that "nciNmISpeed" is consistent with "nciNmIFreq".
nciNmIFreq	SCPTnomFreq	50.0Hz	0...200.0Hz, nominal motor frequency. It is important for maximum and minimum speed calculations that "nciNmISpeed" is consistent with "nciNmIFreq".
nciRampUpTm	SCPTrampUpTm	10.0secs	0...6000 seconds, acceleration time
nciRampDownTm	SCPTrampDownTm	10.0secs	0...6000 seconds, deceleration time
nciLocation	SCPTlocation	"NOT SPECIFIED!"	31 Characters, Space to indicate the location of the MSC-3
nciMinOutTm	SCPTminSendTime	0.5 secs	0...6553.4 seconds, minimum interval between variable transmission

MSC-3 Profile Extension Variables – Functional Block Inputs.

Variable	LonWorks SNVT	Comments
nviVSDrun	SNVT_lev_disc	Alternate Run / Stop control function. <u>Do not use nviDrvSpeedStpt</u> when nviVSDrun is in use
nviVSDreference	SNVT_lev_percent	Alternate high-resolution reference input –100.00%...100.00% of nominal rpm. Network updates to this variable will override K22 COMMS PRESET . <u>Do not use nviDrvSpeedStpt</u> when nviVSDreference is in use. Negative reference values specify reverse operation. You must set D05 Reverse to H00 ENABLE to permit the MSC3 to operate the motor in reverse.
nviVSDtripReset	SNVT_lev_disc	Trip clears function that activates I07 RESET digital input function.
nviVSDDO1	SNVT_lev_disc	Allows a LonWorks network to operate a relay of the MSC-3 and options. The MSC-3 relay must use K42 LONDO1 as its relay function.
nviVSDDO2	SNVT_lev_disc	Allows a LonWorks network to operate a relay of the MSC-3 and options. The MSC-3 relay must use K43 LONDO2 as its relay function.
nviVSDAO	SNVT_lev_percent	Allows a LonWorks network value to be realised on the MSC-3 Extended Features option. Zero to full scale output corresponds to 0.00% to 163.83%. e.g. 100% yields approx 3.05 V. The Extended Features option analogue output must use K44 LONAO1 as its output variable. Check the switch settings on the Extended Features to select the output signal type (0...5V, 0...10V or 4...20mA)

MSC-3 LonWorks Option

MSC-3 Profile Extension Variables – Functional Block Outputs.

Variable	LonWorks SNVT	Comments
nvoVSDAnInput	SNVT_lev_percent	Associated with R00 AN1 standard MSC-3 analogue input. Value range is 0 to 100% of nominal rpm
nvoVSDkWhr	SNVT_elec_kwh	Motor energy used with range 0..65535 kWh. This variable reflects the value of K10 kWh run variable.
nvoVSDopAnInput	SNVT_lev_percent	Associated with P22 Analog input on the Extended Features option. Value range is 0 to 100% of nominal rpm analogue input value, 0...100%
nvoVSDrunStatus	SNVT_lev_disc	Indicates the run status of the MSC-3. It reflects the condition of the O00 RUN relay output function.
nvoVSDtripStatus	SNVT_lev_disc	Indicates that a trip has occurred and the drive is not running. It reflects the condition of the O01 TRIP relay output function.
nvoVSDenaStatus	SNVT_lev_disc	Indicates if the MSC-3 enable (EN) terminal is wired in. It reflects the condition of the O13 ENABLED relay output function.
nvoVSDESO	SNVT_lev_disc	Indicates that the MSC-3 is operating in Essential Services Override mode. It reflects the condition of the O02 ESO relay output function.
nvoVSDProof	SNVT_lev_disc	Indicates that the MSC-3 is enabled and has power and not tripped. It reflects the condition of the O03 PROOF relay output function.
nvoVSDARfail	SNVT_lev_disc	Indicates that the MSC-3 has failed to restart. It reflects the condition of the O10 A/R FAIL relay output function.
nvoVSDFWD	SNVT_lev_disc	Indicates that the MSC-3 is rotating in the forward direction. It reflects the condition of the O11 FWD relay output function.
nvoVSDREV	SNVT_lev_disc	Indicates that the MSC-3 is rotating in the reverse direction. It reflects the condition of the O12 REV relay output function.
nvoVSDLoadWarn	SNVT_lev_disc	Indicates that the MSC-3 load monitoring has detected a drop in load. It reflects the condition of the O16 LOAD WARNING relay output function.
nvoVSDLonopAI1	SNVT_lev_percent	LonWorks option analogue input No. 1 has the range, 0...100% and is associated with K38 Op AI 1 analogue input.
nvoVSDLonopAI2	SNVT_lev_percent	LonWorks option analogue input No. 2 has the range, 0...100% and is associated with K39 Op AI 2 analogue input.
nvoVSDLonopAI3	SNVT_lev_percent	LonWorks option analogue input No. 3 has the range, 0...100% and is associated with K40 Op AI 3 analogue input.
nvoVSDLonopAI4	SNVT_lev_percent	LonWorks option analogue input No. 4 has the range, 0...100% and is associated with K41 Op AI 4 analogue input.

MSC-3 LonWorks Option

Commissioning notes

Some example scenarios are described below. Please wait the recommended discharge time interval after the removal of power from the MSC-3 before any steps that require wiring and/or the installation of other options. For more details on MSC-3 set up refer to the *MSC-3 Users' Manual* (Document Ref: IM00086). For more details on Extended Features option board set up refer to the *MSC-3 Extended Features Board Instruction Manual* (Document Ref: IM00087).

WARNING! Hazardous voltages internal to the MSC-3 exist with power applied. **DO NOT** remove covers or enclosure panels to gain access to terminals whilst power is applied. Wiring and/or option installation must be done 15 minutes after the removal of the power supply.

Start/Stop and Low-Resolution Reference Speed Control Check List

- Given an MSC-3 with factory defaults loaded, wire terminal “D4” wired to “+5V” to enable remote drive control.
- When the drive is powered, access the **F01 REMOTE** menu item and set **K22 COMMS PRESET** as the reference.
- Install the external interface file with the network management tool.
- Bind or connect to the **nviDrvSpeedStpt** variable to other functional blocks of your LonWorks network. Do not use nviVSDrun and nviVSDreference when **nviDrvSpeedStpt** is in use.
- Bind any additional network variables as required.

Start/Stop and High-Resolution Reference Speed Control Check List

- Given an MSC-3 with factory defaults loaded, wire terminal “D4” wired to “+5V” to enable remote drive control.
- When the drive is powered, access the **F01 REMOTE** menu item and set **K22 COMMS PRESET** as the reference.
- Install the external interface file with the network management tool.
- Bind or connect to the **nviVSDrun** for start/stop control. Bind or connect to **nviVSDreference** for high-resolution speed reference setting. Do not use nviDrvSpeedStpt when **nviVSDrun** and **nviVSDreference** are in use.
- Bind any additional network variables as required.

Start/Stop and High-Resolution Reference PID Control Check List

- Ensure that the Extended Features option board is installed.
- Given an MSC-3 with factory defaults loaded and given an Extended Features option board with factory defaults loaded, wire terminal “D4” wired to “+5V” to enable remote drive control.
- Wire the feedback signal to the analogue input of the Extended Features option. Be sure to set the switch for the feedback signal type i.e. 0..5V, 0..10V or 4..20mA.
- Set any appropriate scaling for the feedback signal. Access the **P05 OPTION REFS** menu. Then access the **P07 User Ref 2** menu item. Choose **P22 Analog Input** at which point the input may be rescaled.
- When the drive is powered, access the **F01 REMOTE** menu item (found in the **F00 REFERENCES** menu) and set **P39 PID Output** as the reference.
- When the drive is powered, access the **P33 SV choice** menu item (found in the **P25 PID Control** menu) and set **K22 COMMS PRESET** as the PID set point reference.
- Install the external interface file with the network management tool.
- Bind or connect to the **nviVSDrun** for start/stop control. Bind or connect to **nviVSDreference** for high-resolution PID reference setting. Do not use nviDrvSpeedStpt when **nviVSDrun** and **nviVSDreference** are in use.
- Bind any additional network variables as required.
- Make any PID tuning adjustments as necessary.

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