MICRO CONTROL SYSTEMS

MCS Total Solutions for all your HVAC\R Control Needs

MCS-CENTRIFUGAL-12
Industrial Control Panel

c UL us
UL 508

CENTRIFUGAL CONTROLS-12 UPGRADE

with Optional VFD Control

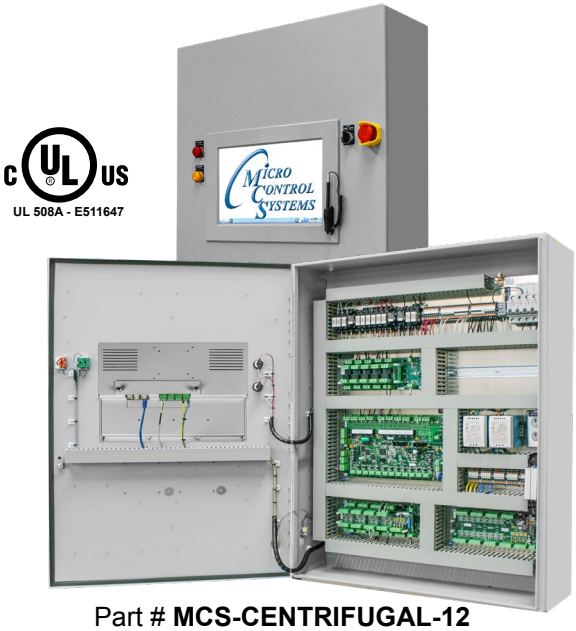
This brochure describes a standard upgrade package for a Centrifugal Chiller.

Each control upgrade installation is unique. It may be necessary to add additional options to the standard upgrade as described in this brochure.

Fill out the brief questionnaire in the back of this brochure and forward to your sales representative for an estimate.

Revision - 2024-02-09
Subject to change without prior notice

Centrifugal Industrial Control Panel



Part # **MCS-CENTRIFUGAL-12**

Description

The MCS-CENTRIFUGAL-12 Industrial Control Panel is made of powder coated aluminum for durability and longevity. A left hand swing door is mounted with three eight-inch hinges for strength. A key lock is provided for security on the door while still giving easy access of the display. This panel is intended for use in an environment protected from the weather.

The control panel consists of a MCS-MAGNUM-N-12, MCS-TOUCH 15.4" touchscreen, MCS-SI-BASE(2) with MCS-SI-EXT(1), MCS-RO-BASE(1) with MCS-RO-EXT(1) expansion boards.

12VDC and 24VDC power supplies included.

The MCS-TOUCH-15.4 capacitive touchscreen interface designed to simplify user access with the MCS-Magnum and MicroMag utilizing MCS-Connect to provide both graphics and service mode access to technicians. Input method: Finger, Stylus or *Glove.

Highly accurate and does not require calibration - easy to clean glass surface. Works outdoors, bright screen, water resistant, exceptional Optics - 1280x800 resolution, sharp and vibrant images.

The MCS-TOUCH-15.4-12 can connect up to 60 MCS controllers and supports RS485 or Ethernet networking.

Control panel includes the following; 20A, 16A and a 5A Single-Pole Circuit Breaker. A 5-port 10/100/1000 Mbps Ethernet Workgroup Switch Industrial rated, Red Alarm Indicator, Yellow Warning Indicator, Emergency Stop Switch with guard and 3 Position Run/Stop Selector Switch.

SHIELDWIRE-GROUNDING multi-terminal connectors are included to eliminate stray electrical current, thereby helping to reduce line noise form the sensors to the controller.

Specifications

Certification.....**UL508A - E511647**

NEMA Rating – Type 1 Control Panel - IP20 Rating

Enclosure is intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment and is not protected from liquids.

Industrial Control Panel

Dimensions of control panel 27"w x 39.75"h x 8.0"d
Mounting Holes..... Mounts with four pre-drilled 15/32" holes
Rated Voltage (Standard).. 120VAC or 230VAC
Phase / Frequency ..... 1 Phase / 60Hz
Full Load Current(approx) . 40A at 120VAC or 20A at 240VAC
Short Circuit Current Rating 10kA

Temp. Range for Control Panel & Touch Screen

Operating Temperature..... -4°F to 158°F (-20°C to 70°C)
Operating Humidity.....0-95% Non-Condensing
Storage Temperature..... -4°F to 158°F (-20°C to 70°C)

MCS-MAGNUM Specification

Microprocessor..... Zilog eZ80 Acclaim! @ 50mhz
Sensor Inputs (SI)..... 12 inputs 0-5vdc (10-bit A/D)
Digital Inputs..... 4 inputs 0 or 5vdc only
Relay Outputs (RO)..... 10 outputs 6.3amps @ 230vac
Analog Outputs (AO)..... 4 outputs 0-10vdc
Printed Circuit Board ..... Six layer with separate power and ground planes
Input Power (Standard)..... 12 vdc Regulated Power Supply
Minimum (Brown in) .....9.44 vdc
Amp Draw (Loaded) .....857.0 mA
RS-485 Comm Port ..... 1 @ 19,200 baud
Ethernet..... 10/100 Mbps Ethernet
Real Time Clock ..... Battery backup
Power Detection ..... Automatic power fail reset

MCS-SI-BASE/EXT Expansion Boards

Sensor Inputs (SI)..... 48 inputs 0-5vdc (2 Base/1Ext)
Analog Outputs (AO)..... 12 outputs 0-10vdc
MCS-I/O Comm Port ..... 1 @ 38,400 baud

MCS-RO-BASE/EXT Expansion Boards

Relay Outputs (RO).....20 outputs 6.3amps @ 230vac
MCS-I/O Comm Port ..... 1 @ 38,400 baud

MCS-Touch-15.4 - Capacitive Touchscreen

Dimensions..... 17"L x 12.11"W x 3.228"H NEMA 4 rating
LCD Screen..... 15.4" (16:10 Diagonal) 16.2 Million Colors 1280x800 Resolution Touchscreen
Touchscreen Surface..... UV Degradation Protection

Power Supply - Specification

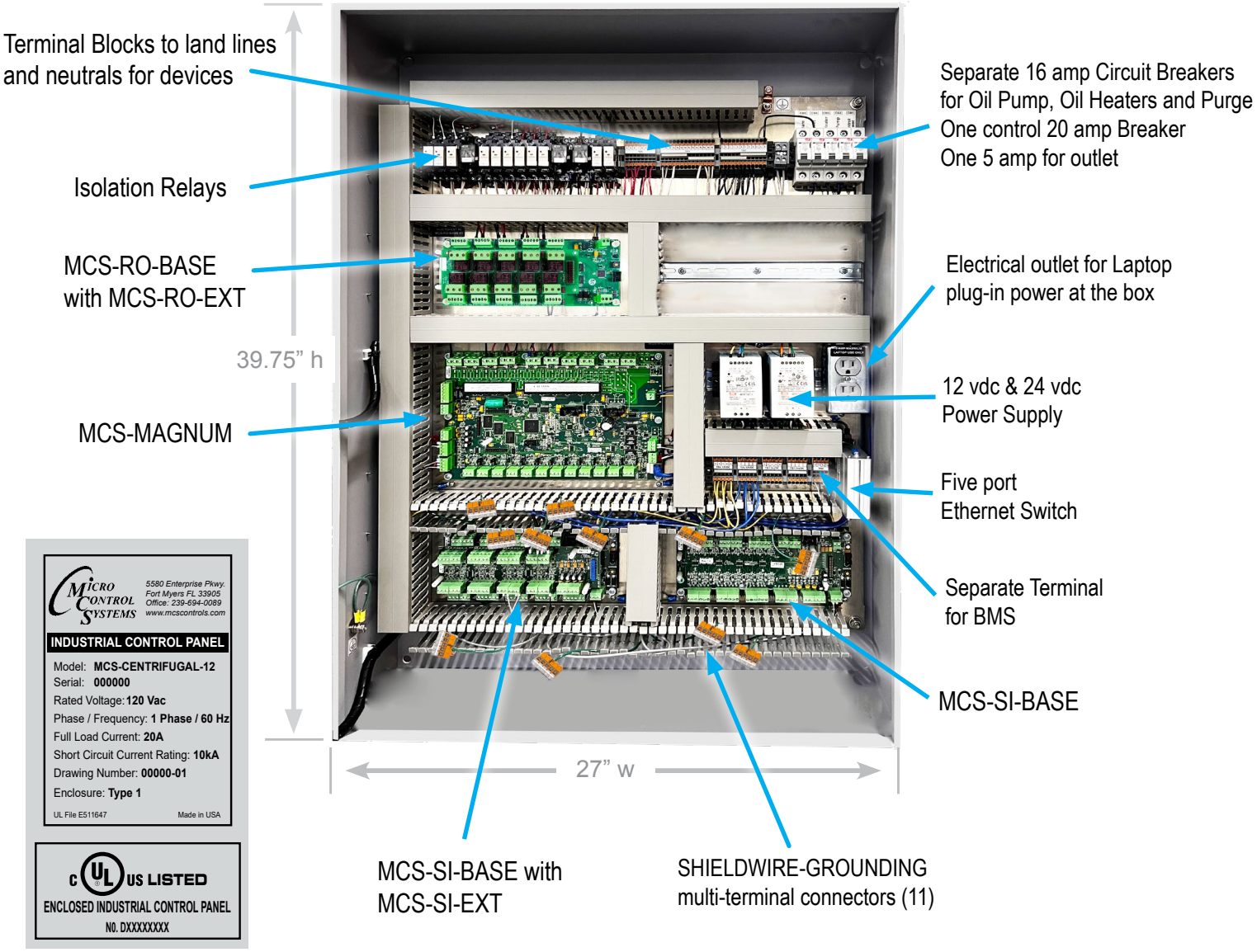
12vdc power supply.....85vac ~ 264vac
AC frequency range.....47 ~ 63Hz
Output rated current.....7.5A
Output rated power.....90W

24vdc power supply.....85vac ~ 264vac
AC frequency range.....47 ~ 63Hz
Output rated current.....4A
Output rated power.....96W

Crossover Cable (orange).. can be used for connecting MCS Touchscreen direct to MCS-MAGNUM or to a Laptop

MCS-MAGNUM-CENTRIFUGAL
INDUSTRIAL CONTROL PANEL

NEMA Rating Type 1- P20 Rating



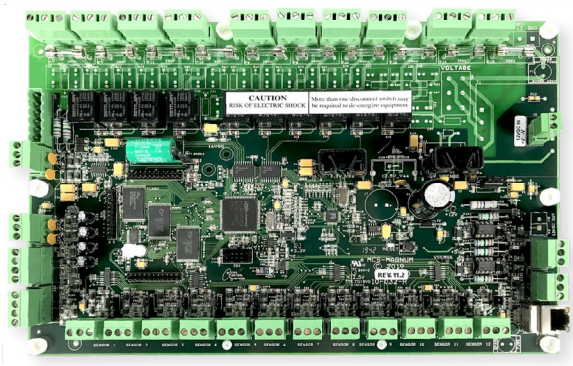
UL 508A Certified Industrial Control Panel

Benefits of selecting an Industrial Control Panel that carries the UL 508A certification include:

- UL 508A certification provides the inspection authority and your customer evidence that the control panel complies with nationally recognized safety standards. These standards ensure public safety and provide assurances that the electrical control panel is compliant with national and local electrical codes.
- For a control panel to carry the UL 508A Listing Mark, the panel must contain only UL recognized and listed components. The UL Mark on a component means that UL has evaluated and tested samples of this component and has concluded that they meet the UL requirements. This protects the quality and integrity of the enclosure and provides guarantee of safe performance.

Centrifugal Typical Control Upgrade

MCS-MAGNUM-N-12



The **MCS-MAGNUM-N-12** is a durable microprocessor based controller designed for the hostile environments in the HVAC/R industry. It is designed to be the primary manager of the package it is controlling.

The Magnum provides flexibility with set points and control options that can be selected prior to commissioning a system or when the unit is live and functioning. The TouchScreen and MCS-CONNECT provide a clear and simple language that informs the user as to the status of the controller.

15.4 Touchscreen

The **MCS-TOUCH-15.4** capacitive touchscreen interface designed to simplify user access with the MCS-Magnum and MicroMag utilizing MCS-Connect to provide both graphics and service mode access to technicians. Input method: Finger, glove, stylus.

Highly accurate and does not require calibration - easy to clean glass surface. Works outdoors, bright screen, water resistant, Exceptional Optics - 1280x800 resolution, sharp and vibrant images.

MCS-TOUCH-15.4 comes preloaded with the MCS-CONNECT program that allows you to view the ‘unit’s status’, ‘extended history’, ‘alerts’, ‘alarms’, setpoints, and more, all in a user-friendly graphic format.

SYSTEM OVERVIEW SCREEN

- Freescale i.MX6 Dual Core 800mhz Motherboard
- ARM 9 32-bit RISC ARM processor
- 1Gb of 512mhz DDR3 RAM memory
- 4Gb of eMMC Flash memory
- 10m/100m/1G Ethernet
- 1 Micro-SD Slots
- 1 USB On-The-Go
- 2 USB Host 2.0
- Real Time Clock w/ Battery
- 3 RS485 communication ports

Centrifugal Typical Control Upgrade

Graphics For Touchscreens

With the new Graphical Interface and MCS-CONNECT, you now have a better view of your controller's many functions as shown on the screens.

The basic graphics package is pre-installed and can be customized by OEMs with the MCS Graphic Builder or custom build by MCS for your controllers. See below some customized screens.

Standard screens include:

- System Oveview Screen
- Compressor Overview Screen
- Evaporator/Condenser Overview Screen
- Documents

Additional screens can be added depending on the custom configuration of your system.

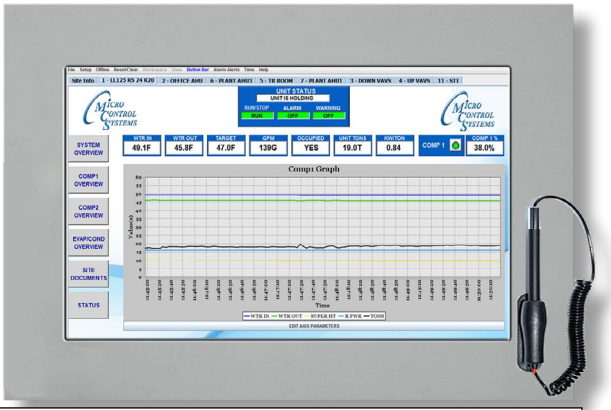
COMPRESSOR OVERVIEW SCREEN

Documents, Spec Sheets, Drawings, etc.

Stored in the Touchscreen's flash memory you will find pdf's and documents pertaining to the building of your unit. Each unit's configuration is different, so the 'SITE DOCUMENTS' file will pertain to that unit only and stored at the site.

1. DRAWINGS (PDF'S) of the components used in this unit
2. MANUALS (if installed in your unit)
   a. Getting Started Manual
   b. Keypad Manual
   c. Touchscreen Manual
   d. MCS-CONNECT Manual
   e. EXV Manual
   f. BMS-GATEWAY Startup Guide

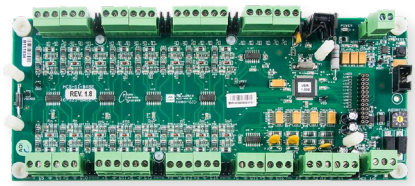
EVAP/COND OVERVIEW SCREEN



OPTIONAL 'GRAPHS OVERVIEW SCREEN IN REAL TIME'

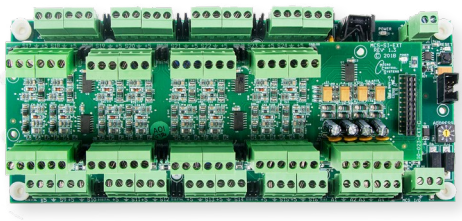
Centrifugal Typical Control Upgrade

MCS-SI-BASE



The **MCS-SI-BASE** provides a flexible and cost effective way to allow sensor input and analog output expansion for the **MCS MAGNUM**. Each MCS-SI-BASE has a stand-alone microprocessor which communicates with the MCS MAGNUM over the MCS-I/O port at 38,400 baud. All data is check summed with auto error correction. Because communication is over a RS-485 long distance two-wire differential network transmission system, the MCS-SI-BASE may be located up to 5,000 feet away.

Each MCS-SI-BASE board is powered by a 12VDC regulated power supply and has a automatic power fail reset system.



MCS-SI-EXT mounted to MCS-SI-BASE

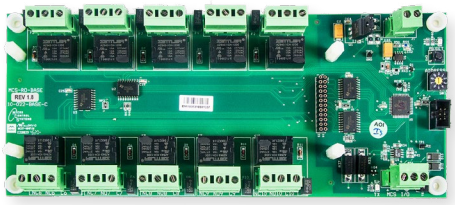
MCS-SI-EXT

The **MCS-SI-EXT** provides a flexible and cost effective way to allow sensor input and analog output expansion for the **MCS MAGNUM**.

Each MCS-SI-EXT can be paired with a MCS-SI-BASE to double the number of inputs and outputs. Each

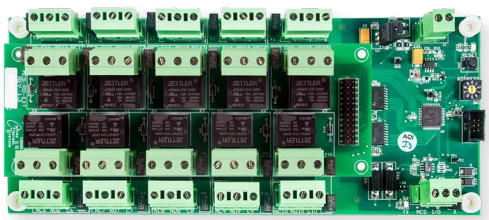
MCS-SI-EXT board is powered by the MCS-SI-BASE board once it is stacked on top.

MCS-RO-BASE



The **MCS-RO-BASE** provides a flexible and cost effective way to allow relay output expansion for the **MCS-MAGNUM**. Each MCS-RO-BASE has a stand-alone microprocessor which communicates with a Magnum/Micromag over the MCS-I/O port at 38,400 baud. All data is check summed with auto error correction. Because the communication is over a RS-485 long distance two-wire differential network transmission system, the MCS-RO-BASE may be located up to 5,000 feet away.

The MCS-RO-BASE board is powered by a 12VDC regulated power supply.



MCS-RO-EXT mounted to MCS-RO-BASE

MCS-RO-EXT

The **MCS-RO-EXT** provides a flexible and cost effective way to allow relay output expansion for the **MCS MAGNUM**.

Each MCS-RO-EXT can be paired with a MCS-RO-BASE to double the number of outputs.

Each MCS-RO-EXT board is powered by the MCS-RO-BASE board once it is stacked on top.

Centrifugal Typical Control Upgrade

MCS-PRESSURE TRANSDUCERS*

The **MCS Pressure Transducers** are one of the most economical and durable options on the market for dealing with high-pressure industrial applications.

In addition to being CE and UL approved, MCS transducers are capable of surviving high vibration. They include a cavity built out of solid 17-4 PH stainless steel ¼" SAE Female Flare fitting & Schrader valve; 7/16-20 UNF pipe thread which creates a leak-proof, all metal sealed system that makes the transducers ideal for use with rugged HVAC environments.

The **MCS-150AC** pressure transducer is specially designed for use in low pressure HVAC/refrigeration applications, in the most demanding environments. The MCS-150A pressure transducer uses absolute zero as a definitive reference point, absolute pressure remains precise and accurate regardless of changes in ambient or process temperature.

*MCS-Pressure Transducers are matched to the system being upgrade.

MCS-T-100 Temp Sensor

An extremely fast acting temperature sensor built for demanding environments. It is ideal for high moisture locations with continuous freeze and thaw cycles. The sensor is potted with a thermally conductive RTV Cure Silicon Adhesive to guarantee durability and response. Its high accuracy allows for interchangeability in the field.
The large resistance range allows the use of over 1000' of cable with no noticeable effect.
The MCS-T100 sensor has the ability to move from 32ºF to 212ºF in approximately 10 to 15 seconds.

MCS-Wells/Tubes

The **MCS-WELL** was designed to be used with the MCS-T100 temperature sensor, although it has other applications. It is used in the Centrifugal chillers in the chilled water and condenser water lines. It comes pre-filled with heat conductive compound to aid in temperature to the sensor.

1/2 - 3"

The **MCS-TUBE** can be epoxied to a discharge or suction line on the Centrifugal chillers in order to obtain temperature readings without the use of a well. It was designed to be used with the MCS-T100 temperature sensor and comes pre-filled with heat conductive compound to aid in transferring temperature to the sensor.

1/4- 2.5"

Centrifugal Typical Control Upgrade

MCS-CT300/500/750/1500*

MCS Current Sensor monitors current flowing to electrical equipment. The magnitude of the current is converted to a linear output voltage between 0.06 to 4.52vdc which can be read as a standard analog input signal. The signal is used by MCS micro controllers for the following:

1. For slide valve control on screw machines
2. For high amp motor overload protection
3. For verification of device on / off

The MCS-CT series are the solid-core version, where the conductor runs through the sensor. No cutting, taping or rerouting is required. The current sensors are accurate, reliable, easy to install and require no service.

*MCS-CT is matched to the system being upgraded.

MCS-USB-RS485

The **MCS-USB-RS485** is a USB to RS485 cable that provides a fast simple way to connect a **MCS-MAGNUM** to a Laptop or PC.

The MCS-USB-RS485 cable contains a small internal electronic circuit board, which converts USB to RS485 with LED indicators for transmit (TX=Red) and receive (RX=Green).

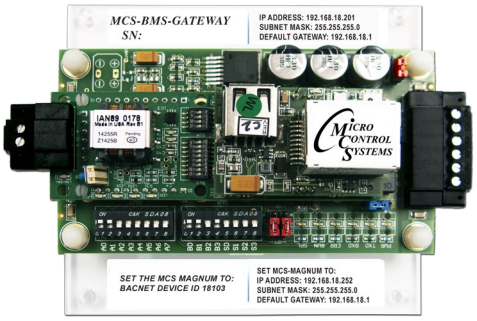
MCS-EPOXY

- Pre-measured resins and hardeners in one tube
- Easy to use - bonds, seals, plugs, molds and rebuilds
- No special tools needed
- Can even harden under water

- Pressure tested to ..... 1300 psi
- Temperatures up to ..... 500 degree F
- Color..... Gray
- Density ..... 15.9 lb/gal (1.9 g/cc)
- Hardness (Shore D) 85
- Tensile Strength ..... 6000 psi
- Compressive Strength ..... 18.000 psi
- Modulus of Elasticity ..... 6 x 105 psi
- Shear Strength ..... 700 psi

Centrifugal Typical Options

MCS-BMS GATEWAY



The **MCS-BMS-GATEWAY** is a microprocessor based communication device that provides translation from Bacnet IP, Bacnet MSTP, Modbus IP, Lontalk, or Johnson N2 communication interface. Information that can be transmitted includes the status of control points, alarm information, digital inputs, analog inputs or setpoints.

The MCS-BMS-GATEWAY protocol is field selectable by setting jumper on the device. Using **MCS-CONFIG** and the CONFIG files for the MCS-MAGNUM, you can automatically create the CSV files that is required by the MCS-BMS-GATEWAY.

MCS-PHASE-B

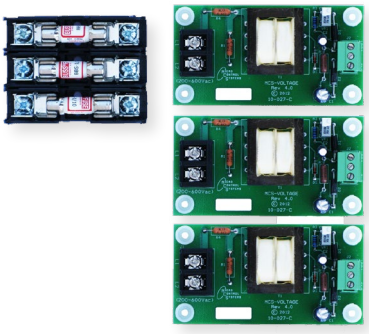
The **MCS-PHASE-B** is a programmable 3-phase line voltage monitor, high temperature LCD display, easy setup and clear diagnostic readout of system faults. The MCS-PHASE-B was specifically designed to protect motors and other 3-phase loads from premature failure and damage due to common voltage faults such as unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling.alance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling.

MCS-WIRELESS MODEM-B

The **MCS-WIRELESS-MODEM-B** is a powerful tool that is especially useful in locations where there is no readily available internet connection. The MCS-WIRELESS-MODEM-B provides instant network connectivity with a modem.

The MCS-WIRELESS-MODEM-B is ideal as a primary connection solution where wired internet is not available. It also supports traditional wired data networks like DLS or Cable for maximum network flexibility.

MCS-VOLTAGE-3PH



The **MCS-VOLTAGE-3PH** measures AC voltage between 200-600 AC. It is designed to monitor the voltage of each phase of the main input power to the unit.

The MCS-VOLTAGE-3PH sensor provides three separate DC voltage outputs that correspond to the AC voltage it is measuring.

This sensor allows the **MCS-Magnum** to safely protect the motors on the unit from under voltage, over voltage and voltage imbalance conditions. It also can be used to calculate unit KW (requires amp and power factor sensors).

Centrifugal Typical Point List

Relay Outputs

#	Output Name	Type	Description
M-1	Comp M	Standard	Compressor main relay for star-delta
M-2	Comp D	Standard	Compressor transition relay for star-delta
M-3	Open Vane	Standard	Vane open: relay output used to open the compressor guide vane.
M-4	Close Vane	Standard	Vane closed: relay output used to close the compressor guide vane.
M-5	Oil Pump	Standard	Oil pump: Turn ON or OFF
M-6	Oil Heater	Standard	Oil heater: Turn ON or OFF
M-7	HotGasByp	Standard	Hot gas bypass: Turn ON or OFF
M-8	Oil Cooler	User Logic - Virtual Point	Oil cooler: Turn ON or OFF
M-9	PurgExhPmp	Standard	Purge exhaust pump: relay will be turned ON when a purge cycle is active, otherwise it will be off.
M-10	Purge Enbl	Standard	Purge enable: relay will be turned ON when the compressor turns on allowing the purge to run
1-1	Purge Sol	Standard	Purge Solenoid: relay turned ON once the purge exhaust pump has been on for one (1) sec.
1-2	WarnLight	Standard	Warning Light: unit is in a safety condition prior to a safety shutdown.
1-3	AlarmLight	Standard	Alarm Light: unit is in a safety shutdown
1-4	Run Status	Standard	Hardwired or BMS point to notify BMS that the unit is running
1-5	Vent Line	Standard	Vent line: Turn ON or OFF
1-6	Hgby Close	Standard	Hot gas bypass closed: pulse relay OPEN
1-7	Hgby Open	Standard	Hot gas bypass open: pulse relay CLOSE
1-8	Chw Pump 1	User Logic - Virtual Point	Chilled water pump #1: Turn ON or OFF
1-9	Chw Pump 2	Standard	Chilled water pump #2: Turn ON or OFF
1-10	Cnd Pump	Standard	Condenser pump: Turn ON or OFF
2-1	Twr Fan 1	Standard	Tower fan #1: Turn ON or OFF
2-2	Twr Fan 2	Standard	Tower fan #2: Turn ON or OFF
2-3	MtrCooling	Standard	Motor cooling: Turn ON or OFF
2-4	Shunt Trip	Standard	Shut Trip: Turn ON or OFF
2-5	OilCycPump	Standard	Oil Cycle Pump: Turn ON or OFF
2-6	VfdCabtFan	Standard	VFD Cabinet Fan: Turn ON or OFF
2-7	DsblNextCh	Standard	Disable Next Chiller: Turn ON or OFF
2-8	Spare 2-8	Standard	Relay output not used
2-9	Spare 2-9	Standard	Relay output not used
2-10	Spare 2-10	Standard	Relay output not used
3-1	Vent Enbl	Standard - Virtual Point	Vent enabled
3-2	Allow Hgby	Standard - Virtual Point	Hot gas bypass allowed
3-3	HwBmsR/S	User Logic - Virtual Point	Hardwired BMS RUN/STOP
3-4	NtBmsR/S	User Logic - Virtual Point	Network BMS RUN/STOP
3-5	UnitEnbTmp	User Logic - Virtual Point	Unit enabled temperature
3-6	ChwPmpDmy	Standard - Virtual Point	Chilled water pump dummy
3-7	PrcPmpDm	Standard - Virtual Point	Process water pump dummy

Centrifugal Typical Point List

Analog Outputs

#	Output Name	Type	Description
M-1	Comp Speed%		Speed signal to compressor VFD
M-2	Cnd Valve%		Percentage to drive the condenser bypass valve
M-3	Tower Fan%		Percentage to drive the tower fan
M-4	Cnd Pump%		Percentage to drive the condenser pump
1-1	ChwPump%		Percentage to drive the chilled water pump
1-2	OilCooler%		Percentage to drive the oil cooler valve
1-3	HotGasByp%		Percentage to drive the hot gas bypass valve

Sensor Inputs

#	Output Name	Type	Description
M-1	ChilWtr In	MCS-T100	Chilled water in temperature
M-2	ChilWtrOut	MCS-T100	Chilled water out temperature
M-3	Evap Psi	MCS-150A	Evaporator pressure
M-4	Cnd Psi	MCS-150A	Condenser pressure
M-5	Hi Oil Psi	MCS-150A	High oil pressure
M-6	Lo Oil Psi	MCS-150A	Low oil pressure
M-7	Suct Tmp	MCS-T100	Suction temperature
M-8	Disc Tmp	MCS-T100	Discharge temperature
M-9	OilFeedTmp	MCS-T100	Oil supply temperature
M-10	OilRetnTmp	MCS-T100	Oil return temperature
M-11	OilSumpTmp	MCS-T100	Oil sump temperature
M-12	Vane %	User Defined	Feedback from the vane actuator indicating the vane position
M-13	VaneClosed	Digital	Vane closed switch: ON or OFF
M-14	Phaseloss	Digital	Phase loss: phase imbalance
M-15	R/S Hand	Digital	Run/Stop/Hand Switch
M-16	Emg/Stop	Digital	Emergency stop switch
1-1	CndRefTmp	MCS-T100	Condenser refrigerant temperature
1-2	EvapRefTmp	MCS-T100	Evaporator refrigerant temperature
1-3	CmpAmpsA	User Logic or MCS-CTxxx	MCS-CTxxx or see 4-10 for remote mounted board
1-4	CmpAmpsB	User Logic or MCS-CTxxx	MCS-CTxxx or see 4-11 for remote mounted board
1-5	CmpAmpsC	User Logic or MCS-CTxxx	MCS-CTxxx or see 4-12 for remote mounted board
1-6	Volts A	User Defined	Volts phase A
1-7	Volts B	User Defined	Volts phase B
1-8	Volts C	User Defined	Volts phase C
1-9	Hi Psi SW	Digital	High pressure switch
1-10	MTR TMP1	User Defined	Motor temperature sensor 1
1-11	MTR TMP2	User Defined	Motor temperature sensor 2
1-12	MTR TMP3	User Defined	Motor temperature sensor 3
1-13	FrtBrngTmp	MCS-T100	Front bearing temperature
1-14	RerBrngTmp	MCS-T100	Rear bearing temperature

Centrifugal Typical Point List

Sensor Inputs (continued)

#	Output Name	Type	Description
1-15	TransOK	Digital	Transition starter OK
1-16	PurgeMode	Mode Sel SW	Purge HAND/ON/OFF switch
2-1	PurgSucTmp	MCS-T100	Purge suction temperature
2-2	PurgLiqTmp	MCS-T100	Purge liquid temperature
2-3	PurgSafety	Digital	On or OFF
2-4	PurgFltBot	Digital	Purge Float Bottom (York): oil level in purge canister
2-5	PurgFltTop	Digital	Purge Float Top (York): oil level in purge canister
2-6	Purge Psi	MCS-150A	Purge pressure (York); pressure in canister
2-7	ChwPsiDiff	User Defined	Chilled water pressure differential: Setpoints 2-7 & 2-8 for evaporator and condenser barrel differential pressure are utilized to calculate GPM flows setpoints 4-1 ~ 4-4
2-8	CondPsiDiff	User Defined	Condenser pressure differential: Setpoints 2-7 & 2-8 for evaporator and condenser barrel differential pressure are utilized to calculate GPM flows setpoints 4-1 ~ 4-4
2-9	OilDiff SW	Digital	Oil pressure differential
2-10	CndWtrIn	MCS-T100	Entering condenser water temperature
2-11	CndWtrOut	MCS-T100	Leaving condenser water temperature
2-12	HwBmsRun	Digital	Hardwired BMS RUN/STOP
2-13	HwBmsDmd	Demand %	Hardwired BMS demand limit: limits how far the compressor will load to
2-14	HwBmsChwr	Target Reset	Hardwired BMS chilled water reset: reset target temperature
2-15	SPARE 2-15	Spare	Sensor Input not used
2-16	SPARE 2-16	Spare	Sensor Input not used
3-1	VFD Fault	Digital	OPTIONAL
3-2	VFD Hetz	User Defined	These setpoints are only utilized if a VFD is present on the compressor motor, otherwise setpoints are SPARE.
3-3	VFD KW	User Defined	If the VFD is hardwired to the controller setpoints 3-1 ~3-4 are utilized
3-4	VFD Volts	User Defined	If communication is required through MODBUS then an the MCS-SI16AO4 is replaced by a MODBUS-IO board
3-5	SPARE 3-5	Spare	Sensor Input not used
3-6	SPARE 3-6	Spare	Sensor Input not used
3-7	SPARE 3-7	Spare	Sensor Input not used
3-8	SPARE 3-8	Spare	Sensor Input not used
3-9	SPARE 3-9	Spare	Sensor Input not used
3-10	SPARE 3-10	Spare	Sensor Input not used
3-11	HiOilTmp	User Logic - Virtual Point	High oil temperature
3-12	UnitInL/O	User Logic - Virtual Point	Unit In LOCKOUT
3-13	CtlRun/Stp	User Logic - Virtual Point	Control RUN/STOP
3-14	SPARE 3-14	Spare	Sensor Input not used
3-15	SPARE 3-15	Spare	Sensor Input not used
3-16	SPARE 3-16	Spare	Sensor Input not used

Centrifugal Typical Point List

Virtual Points for User Logic

#	Output Name	Type	Description
4-1	ChwFlow	User Logic - Virtual Point	Chiller Flow: Flow switches and GPM based on differential pressures
4-2	CndFlow	User Logic - Virtual Point	Condenser Flow: Flow switches and GPM based on differential pressures
4-3	ChwGPM	User Logic - Virtual Point	Chilled water GPM Flow switches and GPM based on differential pressures
4-4	CdwGPM	User Logic - Virtual Point	Condenser water GPM Flow switches and GPM based on differential pressures
4-5	NetBmsRun	BMS-SI	Network BMS run: Field selectable BMS hard wired or network points
4-6	NetBmsDmd	BMS-SI	Network BMS demand
4-7	NetBmsCwr	BMS-SI	Network BMS chilled water reset
4-8	FLA%	User Logic - Virtual Point	Full load amps
4-9	Lift	User Logic - Virtual Point	Lift ratio: either difference between suction/discharge temperature or pressure
4-10	ChwApproch	User Logic - Virtual Point	Chilled water approach: difference between refrigerant temperature/leaving water temperature
4-11	ChwDiffTmp	User Logic - Virtual Point	Chilled differential temperature: difference between entering/leaving temperature
4-12	CdwApproach	User Logic - Virtual Point	Condenser water approach: difference between saturated discharge temperature minus the condenser leaving water
4-13	CdwDiffTmp	User Logic - Virtual Point	Condenser differential temperature: difference between leaving/entering temperature
4-14	SPARE 4-14	Spare	Sensor Input not used
4-15	Subcooling	User Logic - Virtual Point	Subcooling: saturated liquid temperature minus actual liquid temperature
4-16	SuctSuperH	User Logic - Virtual Point	Suction superheat: suction temperature minus saturated suction temperature
5-1	HiBrngTmp	User Logic - Virtual Point	High bearing temperature: average of 1-13 & 1-14
5-2	MtrTmp1&2	User Logic - Virtual Point	Motor temperature: average of 1-10 ~1-12
5-3	HiMtrTmp	User Logic - Virtual Point	High motor temperature: average of 1-10~1-11
5-4	Unit Tons	User Logic—Virtual Point	Calculation of the unit tons
5-5	Units KW	User Logic - Virtual Point	Calculation of the unit KW
5-6	Kw/Tons	User Logic - Virtual Point	Calculation of the GPM
5-7	PwrFactor	User Logic - Virtual Point	Power Factor: Fixed value calculating KW
5-8	HiSuctSH	User Logic - Virtual Point	High suction superheat
5-9	OilPsiSwOK	User Logic - Virtual Point	Oil pressure switch verification
5-10	Clock=0	User Logic - Virtual Point	Calculation to look at cycling the oil pump
5-11	Clock=30	User Logic - Virtual Point	Calculation to look at cycling the oil pump
5-12	Subcooling	User Logic - Virtual Point	Subcooling: saturated liquid temperature minus actual liquid temperature
5-13	SPARE 5-13	Spare	Sensor Input not used
5-14	TrueAmpsA	User Logic - Virtual Point	Calculating 4160 amps on current step down transformer

Virtual Points for User Logic (continued)

5-15	TrueAmpsB	User Logic - Virtual Point	Calculating 4160 amps on current step down transformer
5-16	TrueAmpsC	User Logic - Virtual Point	Calculating 4160 amps on current step down transformer
6-1	Run HGBY	User Logic - Virtual Point	Logic involved with the operation of hotgas
6-2	HGBYclose1	User Logic - Virtual Point	Close Logic involved with the operation of hotgas
6-3	HGBY open	User Logic - Virtual Point	Logic involved with the operation of hotgas
6-4	HGBYclose2	User Logic - Virtual Point	Logic involved with the operation of hotgas
6-5	HGBYclose3	User Logic - Virtual Point	Logic involved with the operation of hotgas
6-6	HwBmsDMD	User Logic - Virtual Point	Logic involved with the operation of the hardwired BMS
6-7	HwBmsRSET	User Logic - Virtual Point	Logic involved with the operation of the hardwired BMS
6-8	NtBmsDMD	User Logic - Virtual Point	Logic involved with the operation of the hardwired BMS
6-9	NtBmsRSET	User Logic - Virtual Point	Logic involved with the operation of the hardwired BMS
6-10	BMS R/S	User Logic - Virtual Point	Logic involved with the operation of the hardwired BMS
6-11	BMS DMD	User Logic - Virtual Point	Logic involved with the operation of the hardwired BMS
6-12	BMS RESET	User Logic - Virtual Point	Logic involved with the operation of the hardwired BMS
6-13	SPARE 6-13	Spare	Sensor Input not used
6-14	SPARE 6-14	Spare	Sensor Input not used
6-15	SPARE 6-15	Spare	Sensor Input not used
6-16	Allow Unit	User Logic	Run/stop indicator for graphic display

Centrifugal Upgrade Information

Company: _____ Phone: _____

Name: _____ Title: _____ Mobile: _____

Email:_____

Centrifugal Controls Upgrade Ordering Information

Make of Compressor	Model Number	Refrigerant Used	Full Load Amps of Compressor
☐ Carrier			
☐ McQuay			
☐ Trane			
☐ Dunham&Bush			
Other _____			

Does the compressor have a remote starter ☐ YES ☐ NO

Does the compressor have a VFD (Variable Frequency Drive)? ☐ YES ☐ NO

Will the VFD be hardwired to MCS-controls or over MODBUS? ☐ Hardwired ☐ MODBUS

Building Management System Information

DO YOU WANT:	NONE	HARDWIRED	NETWORK
BMS Target Reset	☐	☐	☐
BMS Run/Stop	☐	☐	☐
BMS Demand Step Limiting	☐	☐	☐
BMS Demand FLA% Limiting	☐	☐	☐

If communication to the BMS is lost default the BMS run to:

☐ ON (run the unit) ☐ OFF (shut the unit off) ☐ NO CHANGE (leave the unit in the current mode)

Do you want to override any setpoints? ☐ YES ☐ NO If yes, what setpoints? _____

Network Connect

IP Address _____ Subnet _____ Default GateWay _____

Ethernet

☐ BACnet IP ☐ Modbus IP	BACnet Device ID	BACnet IP Port

RS485

☐ BACnet MSTP	Address ☐ Number can be 0-99)
☐ Modbus RTU	Baud Rate
☐ Johnson N2	MAX Masters
☐ Lontalk	Network #

COMMENTS (if there is any other information we should know?

5580 Enterprise Pkwy., Fort Myers, FL 33905
Office: 239-694-0089 • Fax: 239-694-0031
www.mcscontrols.com