



*MCS Total  
Solutions for all your  
HVAC/R Control Needs*



**MCS-CENTRIFUGAL-12  
Industrial Control Panel**



# ***19XL / XR / XRV Series CONTROLS-12 UPGRADE with Optional VFD control***

This brochure describes a standard upgrade package for the 19X 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 questionnaire in the back of this brochure and forward to your sales representative for an estimate.





# 19XL / XR Series Control Enclosure Upgrade



19XR Chiller before upgrade  
old Carrier controls



19XR Chiller Upgraded to  
MCS-CONTROLS

## MCS Centrifugal-12 - NEMA rating - Type 1

Dimensions - 27" w x 39.75" h x 8.0" d

Certification - UL508A

## MCS-MAGNUM-N-12

### Controller 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) ..... 12vdc  
 MCS-I/O Comm Port ..... 1 @ 38,400 baud  
 RS-485 Comm Port ..... 1 @ 19,200 baud  
 Ethernet..... 10/100 Mbps Ethernet  
 Real Time Clock ..... Battery backup  
 Power Detection ..... Automatic power fail reset

## Touch Screen 15.4

Dimensions..... 12.11"W x 17"L X 3.228"H  
 LCD Screen..... 15.4" (16:10 Diagonal),  
 16.2 Million Colors,  
 1280x800 Resolution

The **MCS-CENTRIFUGAL-12** comes standard equipped with an MCS-MAGNUM-N-12 controller board, 15.4" Touch Screen, three 16 amp, one 20 amp and one 5 amp circuit breakers. There is also an electrical outlet for laptop plug-in power at the panel.

The Enclosure has the following expansion boards installed:

One (1) MCS-SI-Base, One (1) MCS-SI-BASE with MCS-SI-EXT, and

ONE (1) MCS-RO-Base with MCS-RO-EXT.  
 With the expansion boards you have a total of:

- 60 Sensor Inputs
- 30 Relay Outputs
- 16 Analog Outputs

Standard configuration includes: Isolation relays, BMS Network connectivity, (Field selectable hardware or network BMS), and BMS terminal block for chiller relay.

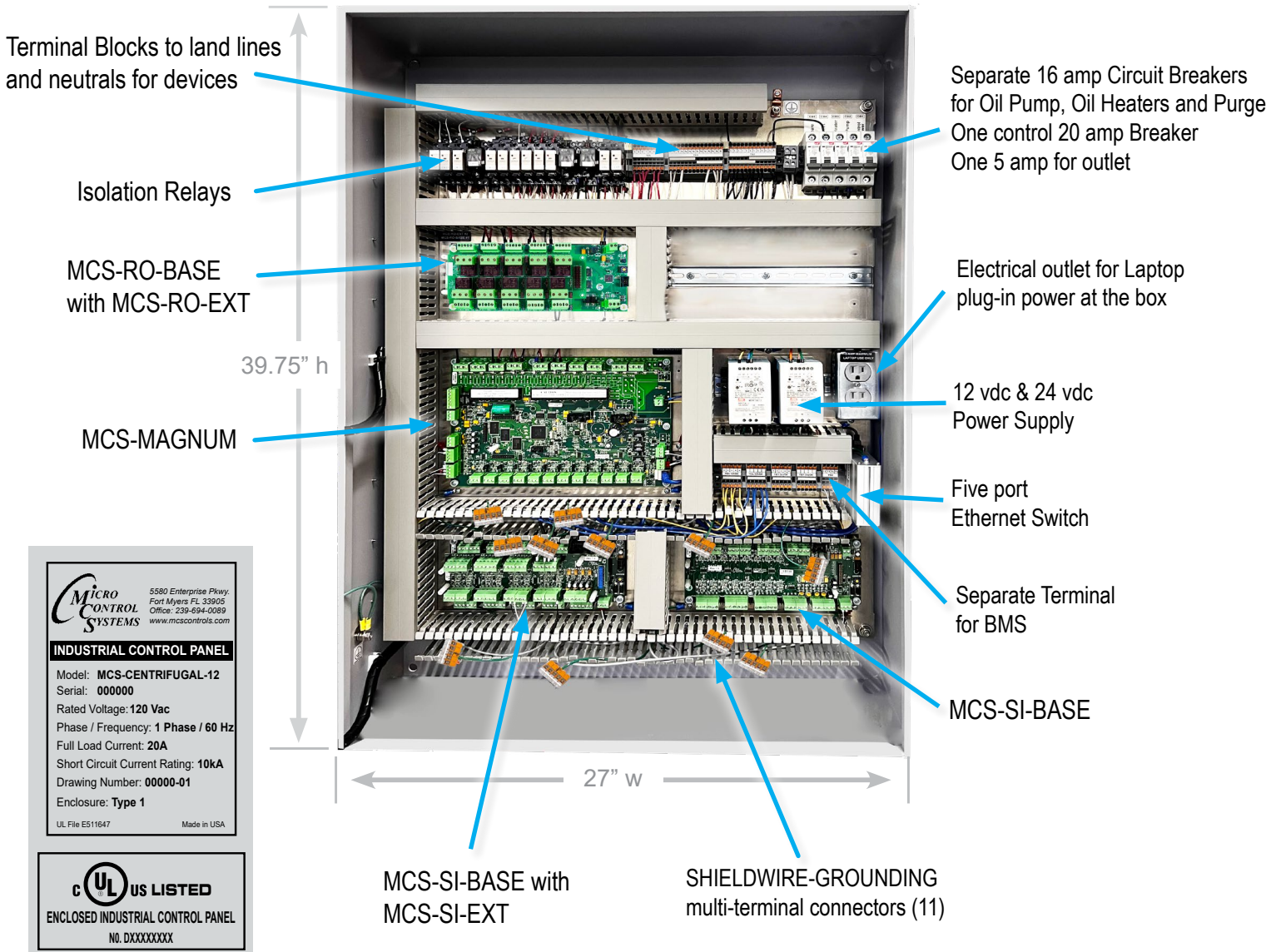
The following warning lights and switches are included in the standard enclosure; Alarm, Warning, Emergency SW, Hand/Off/ Auto Switch.

This panel is intended for use in an environment protected from the weather.



# 19XL / XR Series Control Enclosure Upgrade

NEMA Rating Type 1- IP20 Rating



## UL 508A Certified Industrial Control Panel



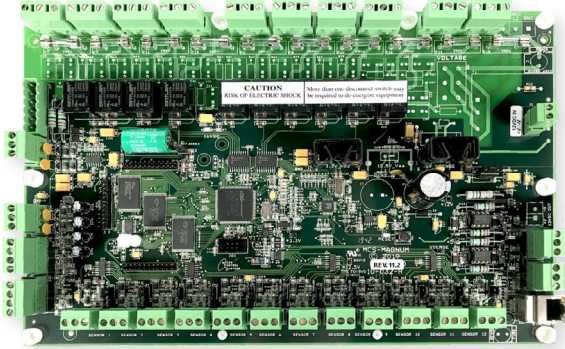
Benefits of selecting an Industrial Control Panel that carries the UL 508A certification include:

- 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.



# 19XL / XR Series Control Enclosure 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.

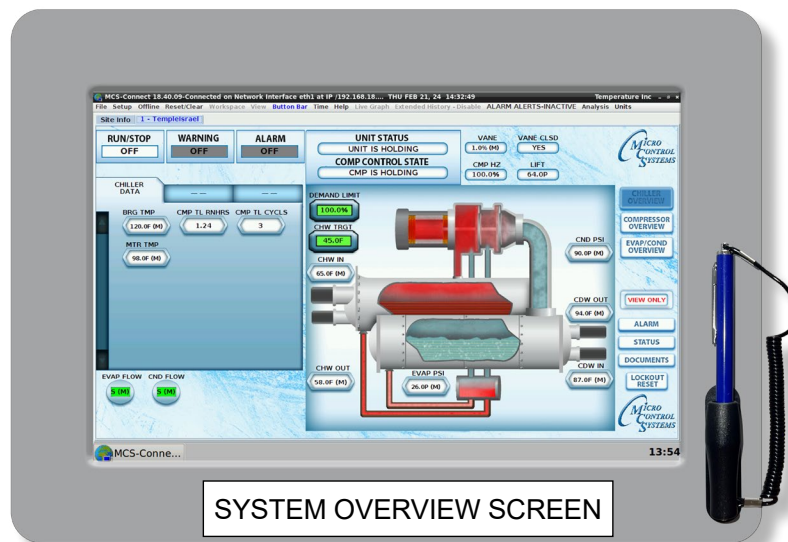
The Magnum provides flexibility with set points and control options that can be selected prior to commissioning a system or when the unit is live and functioning. The TouchScreen and MCS-CONNECT provide a clear and simple language that informs the user as to the status of the controller.

## 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





# 19XL / XR Series Control Enclosure 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 can be powered by a 12VDC regulated power supply and has a automatic power fail reset system.

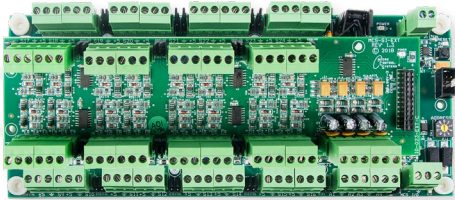


## MCS-SI-EXT

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.

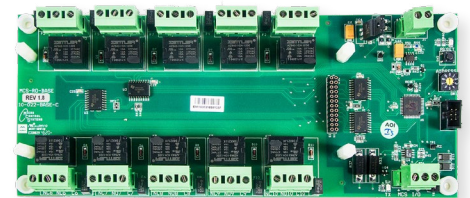


MCS-SI-EXT mounted to  
MCS-SI-BASE

## 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.

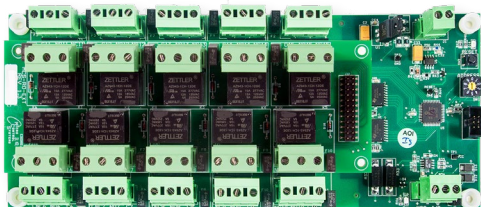


## MCS-RO-EXT

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.



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

# 19XL / XR Series Control Enclosure Upgrade

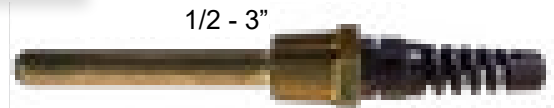
## MCS-T-100 Temp Sensor



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 32°F to 212°F 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 19XR series chillers in the chilled water and condenser water lines. It comes pre-filled with heat conductive compound to aid in temperature to the sensor.



The **MCS-TUBE** can be epoxied to a discharge or suction line on the 19XR series 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.

## MCS-USB-RS485



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

When the MCS-USB-RS485 cable is plugged into a laptop or PC, Windows will install a device driver that allows the cable to be used as a standard Window communication port.

## MCS-CARRIER 5K-ADAPTER

The 19X series chillers comes equipped with embedded 5K thermistors in the motor. There are two (2) thermistors factory installed in each compressor. There are three (3) terminals for the thermistors. (S1, S2 & C) Motor temperature is measured by leads connected to one of the S terminals and the C terminal.

The thermistor's are not field serviceable. If both motor thermistors fail the compressor needs to be replaced.

In order to monitor the motor on the 19X series chillers a cable is installed on the C and S1 terminals of the Carrier's thermistor and then wired along with the MCS-CARRIER 5K-ADAPTER to a sensor input on the MCS-MAGNUM or MCS-SI-BASE board. This allows the MAGNUM to monitor the temperature of the 19X series motors for proper operation.

A wiring diagram and instructions are included with the MCS-CARRIER 5K-ADAPTER.





# 19XL / XR Series Control Enclosure Upgrade

## MCS-CT300



The **MCS-CT300** current sensor monitors current flowing to electrical equipment. The magnitude of the current is converted to a linear 0 to 5vdc output signal 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

## 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.

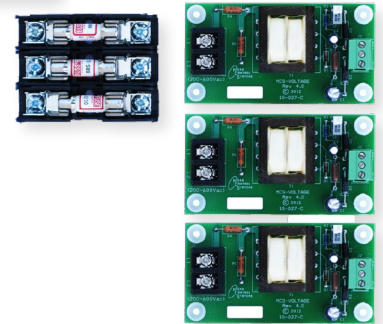
In addition to being CE and UL approved, MCS transducers are capable of surviving high vibration. They include a cavity built out of solid 17-4 PH stainless steel 1/4" SAE Female Flare fitting & Schrader valve; 7/16-20 UNF pipe thread which creates a leak-proof, all metal sealed system that makes the transducers ideal for use with rugged HVAC environments.

## 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.

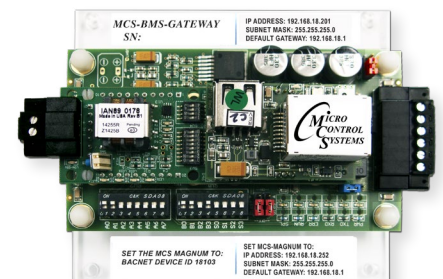
This sensor allows the **MCS-Magnum** to safely protect the motors on the unit from under voltage, over voltage and voltage imbalance conditions. It also can be used to calculate unit KW (requires amp and power factor sensors).



## 19XL / XR Typical Options

### BMS GATEWAY

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





# MCS Typical Point List

## Relay Outputs

#	Output Name	Type	Description
M-1	CompM	Standard	Compressor Start Main
M-2	CompD	Standard	Compressor Start Delta
M-3	OpenVane	Standard	Vane open: relay output used to open the compressor guide vane.
M-4	CloseVane	Standard	Vane closed: relay output used to close the compressor guide vane.
M-5	OilPump	Standard	Oil pump: Turn ON or OFF
M-6	OilHeater	Standard	Oil heater: Turn ON or OFF
M-7	HtrLock	User Logic	Heater Lock (Lock is ON when Compressor is ON)
M-8	Spare	X	Not Used - Reserved for Expansion
M-9	Spare	X	Not Used - Reserved for Expansion
M-10	Spare	X	Not Used - Reserved for Expansion

1-1	Spare	X	Not Used - Reserved for Expansion
1-2	Warning	Standard	Warning Light: unit is in a safety condition prior to a safety shutdown.
1-3	Alarm	Standard	Alarm Light: unit is in a safety shutdown
1-4	RunStatus	User Logic	Hardwired or BMS point to notify BMS that the unit is running
1-5	Spare	X	Not Used - Reserved for Expansion
1-6	Spare	X	Not Used - Reserved for Expansion
1-7	Spare	X	Not Used - Reserved for Expansion
1-8	ChwPump	Standard	Chilled Water Pump: Turn ON or OFF
1-9	CondPump	Standard	Condenser Pump: Turn ON or OFF
1-10	Spare	X	Not Used - Reserved for Expansion

2-1	Spare	X	Not Used - Reserved for Expansion
2-2	Spare	X	Not Used - Reserved for Expansion
2-3	MtrCooling	User Logic	Motor Cooling: Turn ON or OFF
2-4	Spare	X	Not Used - Reserved for Expansion
2-5	Spare	X	Not Used - Reserved for Expansion
2-6	Spare	X	Not Used - Reserved for Expansion
2-7	Spare	X	Not Used - Reserved for Expansion
2-8	Spare	X	Not Used - Reserved for Expansion

# MCS Typical Point List

## Relay Outputs (contined)

#	Output Name	Type	Description
2-9	Spare	X	Not Used - Reserved for Expansion
2-10	Spare	X	Not Used - Reserved for Expansion
3-1	Spare	X	Not Used - Reserved for Expansion
3-2	Spare	X	Not Used - Reserved for Expansion
3-3	HwBmsR/S	User Logic	Hardwired BMS Run/Stop
3-4	NtBmsR/S	User Logic	Virtual Network Point for BMS Run/Stop
3-5	Spare	X	Not Used - Reserved for Expansion
3-6	Spare	X	Not Used - Reserved for Expansion
3-7	Spare	X	Not Used - Reserved for Expansion
3-8	DisHWRst	User Logic	Disallow Hardwire Reset
3-9	DisNetRst	User Logic	DisNetRst
3-10	HtrlLock	User Logic	Heater Lock (Lock is ON when Compressor is ON)

## Sensor Inputs

#	Input Name	Type	Description
M-1	ChilWtrIn	MCST100	Chilled Water In Temperature
M-2	ChilWtrOut	MCST100	Chilled Water Leaving Temperature
M-3	Suct Psi	MCS--200	Suction Pressure
M-4	DiscPsi	MCS-500	Discharge Pressure
M-5	OilFeedPsi	MCS-500	Oil Supply Pressure
M-6	OilSumpPsi	CARR-5K	Oil Sump Pressure
M-7	SuctTmp	MCST100	Suction Temperature
M-8	DiscTmp	MCST100	Discharge Temperature
M-9	OilFeedTmp	MCST100	Oil Supply Temperature
M-10	Spare	X	Not Used - Reserved for Expansion
M-11	OilSumpTmp	CARR-5K	Oil Sump Temperature
M-12	Spare	X	Not Used - Reserved for Expansion
M-13	VaneClosed	Digital	Vane Closed Switch: ON or OFF
M-14	PhaseLoss	Digiital	Phase Loss: Phase Imbalance



# MCS Typical Point List

## Sensor Inputs (continued)

#	Input Name	Type	Description
M-15	Run/Stop	Digital	Run/Stop Hand Switch
M-16	EmgStop	Digital	Emergency Stop Switch

1-1	CndRefTmp	MCST100	Condenser Refrigerant Temperature
1-2	EvapRefTmp	MCST100	Evaporator Refrigerant Temperature
1-3	CmpAmps A	CT-1500	Reads Amp Draw on Leg 1
1-4	CmpAmps B	CT-1500	Reads Amp Draw on Leg 2
1-5	CmpAmps C	CT-1500	Reads Amp Draw on Leg 3
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	HiPsiSW	Digital	Mechanical Hi Pressure Safety
1-10	MotorTmp	CARR-5K	Motor Temperature
1-11	Spare	X	Not Used - Reserved for Expansion
1-12	Spare	X	Not Used - Reserved for Expansion
1-13	BearingTmp	CARR-5K	Bearing Temperature
1-14	Spare	X	Not Used - Reserved for Expansion
1-15	TransOK	Digital	Transition Starter OK
1-16	Spare	X	Not Used - Reserved for Expansion

2-1	Spare	X	Not Used - Reserved for Expansion
2-2	Spare	X	Not Used - Reserved for Expansion
2-3	Spare	X	Not Used - Reserved for Expansion
2-4	Spare	X	Not Used - Reserved for Expansion
2-5	Spare	X	Not Used - Reserved for Expansion
2-6	Spare	X	Not Used - Reserved for Expansion
2-7	ChwFlowSW	Digital	Proof for Chilled Water Flow
2-8	CdwFlowSW	Digital	Proof for Condenser Water Flow
2-9	OilDiffSW	Digital	Oil pressure differential
2-10	CndWtrIn	MCST100	Condenser Water Incoming Temperature
2-11	CndWtrOut	MCST100	Condenser Water Leaving Temperature

# MCS Typical Point List

## Sensor Inputs (continued)

#	Input Name	Type	Description
2-12	Spare	X	Not Used - Reserved for Expansion
2-13	HwBmsDmd	DEMAND%	Hardwired Point for Demand %
2-14	HwBmsChwr	TRGTRST	Hardwired BMS Chilled Water Reset: Reset Target Temperature
2-15	Spare	X	Not Used - Reserved for Expansion
2-16	Spare	X	Not Used - Reserved for Expansion
3-1	Spare	X	Not Used - Reserved for Expansion
3-2	Spare	X	Not Used - Reserved for Expansion
3-3	Spare	X	Not Used - Reserved for Expansion
3-4	Spare	X	Not Used - Reserved for Expansion
3-5	Spare	X	Not Used - Reserved for Expansion
3-6	Spare	X	Not Used - Reserved for Expansion
3-7	Spare	X	Not Used - Reserved for Expansion
3-8	Spare	X	Not Used - Reserved for Expansion
3-9	Spare	X	Not Used - Reserved for Expansion
3-10	Spare	X	Not Used - Reserved for Expansion
3-11	Spare	X	Not Used - Reserved for Expansion
3-12	UnitInL/O	User Logic	Tests for Unit in Lock Out
3-13	CtlRun/Stop	User Logic	Control Run/Stop
3-14	Spare	X	Not Used - Reserved for Expansion
3-15	Spare	X	Not Used - Reserved for Expansion
3-16	Spare	X	Not Used - Reserved for Expansion
4-1	Spare	X	Not Used - Reserved for Expansion
4-2	Spare	X	Not Used - Reserved for Expansion
4-3	ChwGPM	User Logic	Chilled Water Gallons per Minute. Fixed value or true hardwired input.
4-4	Spare	X	Not Used - Reserved for Expansion
4-5	NetBmsRun	BMS-SI	Virtual Network Point for Run/Stop
4-6	NetBmsDmd	BMS-SI	Virtual Network Point for Demand %
4-7	NetBmsCwr	BMS-SI	Virtual Network Point for Chilled Water Reset: Reset Target Temp
4-8	Fla%	User Logic	Full Load Amp %



# MCS Typical Point List

## Sensor Inputs (continued)

#	Input Name	Type	Description
4-9	Lift	User Logic	Lift Calculation
4-10	ChwAppr	User Logic	Condenser Water Approach: Difference between saturated discharge temperature minus the condenser leaving water temperature
4-11	ChwDiffTmp	User Logic	Chilled Water Temperature Differential: Difference between entering/leaving temperature
4-12	CdwAppr	User Logic	Condenser Water Approach: Difference between saturated discharge temperature minus the condenser leaving water temperature
4-13	CdwDiffTmp	User Logic	Chilled Water Temperature Differential: Difference between entering/leaving temperature
4-14	Spare	X	Not Used - Reserved for Expansion
4-15	Subcooling	User Logic	Subcooling Calculation
4-16	Spare	X	Not Used - Reserved for Expansion

5-1	Spare	X	Not Used - Reserved for Expansion
5-2	Spare	X	Not Used - Reserved for Expansion
5-3	Spare	X	Not Used - Reserved for Expansion
5-4	Unit Tons	TONS	Measures Unit Tons
5-5	Unit KW	KW	Measures Unit KW
5-6	Kw/Tons	User Logic	KW / Ton Calculation
5-7	PwrFactor	User Logic	Power Factor Calculation
5-8	Spare	X	Not Used - Reserved for Expansion
5-9	OilPsiSwOK	User Logic	Proof of Oil Pressure Switch OK
5-10	Spare	X	Not Used - Reserved for Expansion
5-11	Spare	X	Not Used - Reserved for Expansion
5-12	Ctl Flow	User Logic	Control Flow - Tests both Condenser and Chilled Water Flow
5-13	Spare	X	Not Used - Reserved for Expansion
5-14	Spare	X	Not Used - Reserved for Expansion
5-15	Spare	X	Not Used - Reserved for Expansion
5-16	Spare	X	Not Used - Reserved for Expansion

6-1	Spare	X	Not Used - Reserved for Expansion
6-2	Spare	X	Not Used - Reserved for Expansion

# MCS Typical Point List

## Sensor Inputs (continued)

6-3	Spare	X	Not Used - Reserved for Expansion
6-4	Spare	X	Not Used - Reserved for Expansion
6-5	Spare	X	Not Used - Reserved for Expansion
6-6	HwBmsDMD	User Logic	Hardwired Point for Demand %
6-7	HwBmsRset	User Logic	Hardwired Point for Target Reset
6-8	NtBmsDMD	User Logic	Virtual Network Point for Demand %
6-9	NtBmsRset	User Logic	Virtual Network Point for Target Reset
6-10	BMS R/S	User Logic	Virtual Network Point for Run/Stop
6-11	BMS DMD	User Logic	Virtual Network Point for Demand %
6-12	BMS Reset	User Logic	Virtual Network Point for Target Reset
6-13	d/aHwRst	User Logic	Disallow Hardwired Reset
6-14	d/aNetRst	User Logic	Disallow Network Reset
6-15	Spare	X	Not Used - Reserved for Expansion
6-16	Allow Unit	User Logic	Run/stop indicator for graphic display



# 19XR Information

**NOTE: This form has drop down fillable areas. If you are viewing from a brochure, please visit our website for a fillable form that you can email to: [sales@mcscontrols.com](mailto:sales@mcscontrols.com)**

Company: \_\_\_\_\_ Phone: \_\_\_\_\_

Name: \_\_\_\_\_ Title: \_\_\_\_\_ Email: \_\_\_\_\_

Mobile: \_\_\_\_\_ Site: \_\_\_\_\_

Model Number	Serial Number	Refrigerant Used	Full Load Amps of Compressor

1. **Model of existing Panel:**
2. **What is the Starter Type?** **Are we monitoring the Transition OK or Starter Fault?**
  - a. Does the Compressor have a remote starter?      Yes                      No
3. **Is there a Variable Frequency Drive?:** What is the VFD Make and Model?      Make: \_\_\_\_\_                      Model: \_\_\_\_\_
  - a. Will the VFD be hardwired to MCS controls, over MODBUS or both?
  - b. If you are using a VFD other than a Yaskawa VFD, do you need MCS to control the VFD Enclosure Temperature and Fans?      Yes                      No
4. **What protocol will be used for Building Management communication?**
5. **For the Vane Actuator, is there a Digital Switch or a Potentiometer?**
6. **If there is a Potentiometer, what is the Actuator Model?**      Model: \_\_\_\_\_
7. **Will Phase loss need to be monitored?**      Yes                      No      **How would you like the pressures to be displayed?**
8. **Does the Oil Heater have an option for Heater In Lock Out?**      Yes                      No
9. **What kind of Hot Gas Bypass is present?**
10. **Is MCS controlling the Chilled Water Pump(s)?**      Yes                      No      **How will they be wired?**
11. **Is MCS controlling the Condenser Water Pump?**      Yes                      No  
**Will the Condenser Water Pump be wired or will a Condenser Isolation Valve be used?**
12. **Are there Tower Fan(s)**      Yes                      No      **Is MCS controlling these fan(s)? How many are there, how are they wired?**
13. **Does the unit have Motor Cooling?**                      Yes                      No
14. **Does the unit have a Shunt Trip?**                      Yes                      No
15. **What Main Voltage is being supplied to the unit?**      Voltage: \_\_\_\_\_      Is MCS monitoring Main Voltage?      Yes                      No
16. **What is the Control Voltage being supplied?**      Voltage: \_\_\_\_\_
17. **What is the 'RUN LOAD AMPS' (FLA)**                      **COMP 1:**                      **COMP 2:**
18. **Will the Chilled/Condenser Water Flow be measured by Flow or Differential?**
19. **Will Ambient Temperature need to be monitored?**                      Yes                      No
20. **Will MCS be Monitoring the Oil Return Temperature?**      Yes                      No

**COMMENTS (is there any other information we should know?):**





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[www.mcscontrols.com](http://www.mcscontrols.com)