

MCS-Magnum Centrifugal Controller-12 Upgrade

Controls for
Hanbell RTM 030, RTM 050, RTM 070,
RTM 090, RTM 100, RTM 140, RTM 180



*RTM Magnetic Bearing
Compressors*



*Providing HVAC/R
Solutions Worldwide*

MCS-Magnum Magnetic Bearing Centrifugal Controller-12

Centrifugal, two-stage, magnetic-bearing chiller compressors equipped with variable-speed drives are a relatively new technology that operates at a high efficiency. Based on a recent case study, magnetic bearing compressors operate more efficiently than reciprocating and screw compressors, especially during partial load conditions.

The magnetic bearings allow the compressor to operate without the use of oil for lubrication, which reduces energy losses due to friction and increases the heat transfer efficiency of the chiller, because no oil enters the evaporator or the condenser. A variable speed drive on the motor allows the compressor to operate much more efficiently at partial loads than standard compressors. The oil-free system also eliminates the need for oil maintenance, resulting in operations and maintenance savings.

MCS recognized the need for the development of firmware for the control of these new chillers being manufactured today and have been working with OEM manufacturers to supply controls for their units.

The technology is ideally suited for chillers that run at partial load for most of the year. Energy savings are about equal, or near, full load. Magnetic bearing compressors can be applied to air-cooled and water-cooled chillers.

The new variable-speed Magnetic Bearing Centrifugal Compressor technology is a notable improvement over existing reciprocating and screw compressors. In addition to energy and cost savings, the new technology is lighter and quieter.

Making sure your investment is secure and operating at the optimal energy efficiency, install the latest MCS-MAGNUM MAGNETIC BEARING CENTRIFUGAL CONTROLLER and Hanbell RTM Compressors on your chiller.



MCS-MAGNUM MAGNETIC BEARING
CENTRIFUGAL CONTROLLER can be used in
applications controlling Magnetic Bearing Compressors



Hanbell Magnetic Bearing Compressors

Hanbell Magnetic Bearing Compressors

RTM 030

RTM 050

RTM 070

RTM 090

RTM 100

RTM 140

RTM 180



Features of Oil-Free Magnetic Bearing Centrifugal Chiller

- Environment friendly refrigerant-HFC-134a
- Advanced technology of magnetic bearings with the combination of mechanical and electrical control technology. The main shaft is held, rotated and controlled by electromagnetic field.
- Magnetic Bearing Controller monitors each control position 15,000 times per second (both radial/axial direction).
- High Energy Efficiency - VFD Control meets the requirement of running at various working conditions and saving energy based on the load.
- With the DC inverter control technology and inlet guide vane actuator, the compressor can respond quickly to load changes.
- No gear transmission, results in high efficiency.
- Oil free, Zero pollution
- Compared with conventional oil lubricated models, there is no risk of damage to moving parts during power outages.
- Reduced maintenance cost.
- Free of oil problems and oil disposal.

Hanbell RTM Components



DELTA VFD

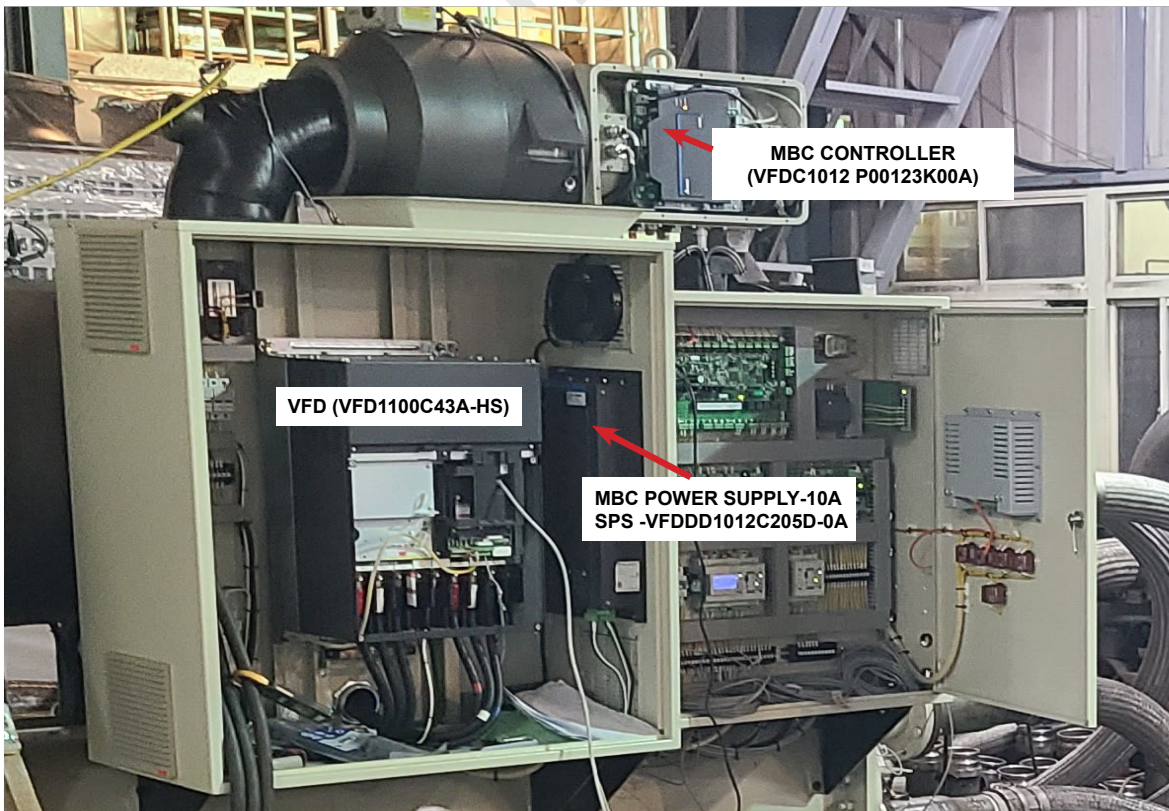


DELTA POWER
SUPPLY



DELTA CONTROLLER

INSTALLED RTM-030 SUPERAIR WITH DELTA



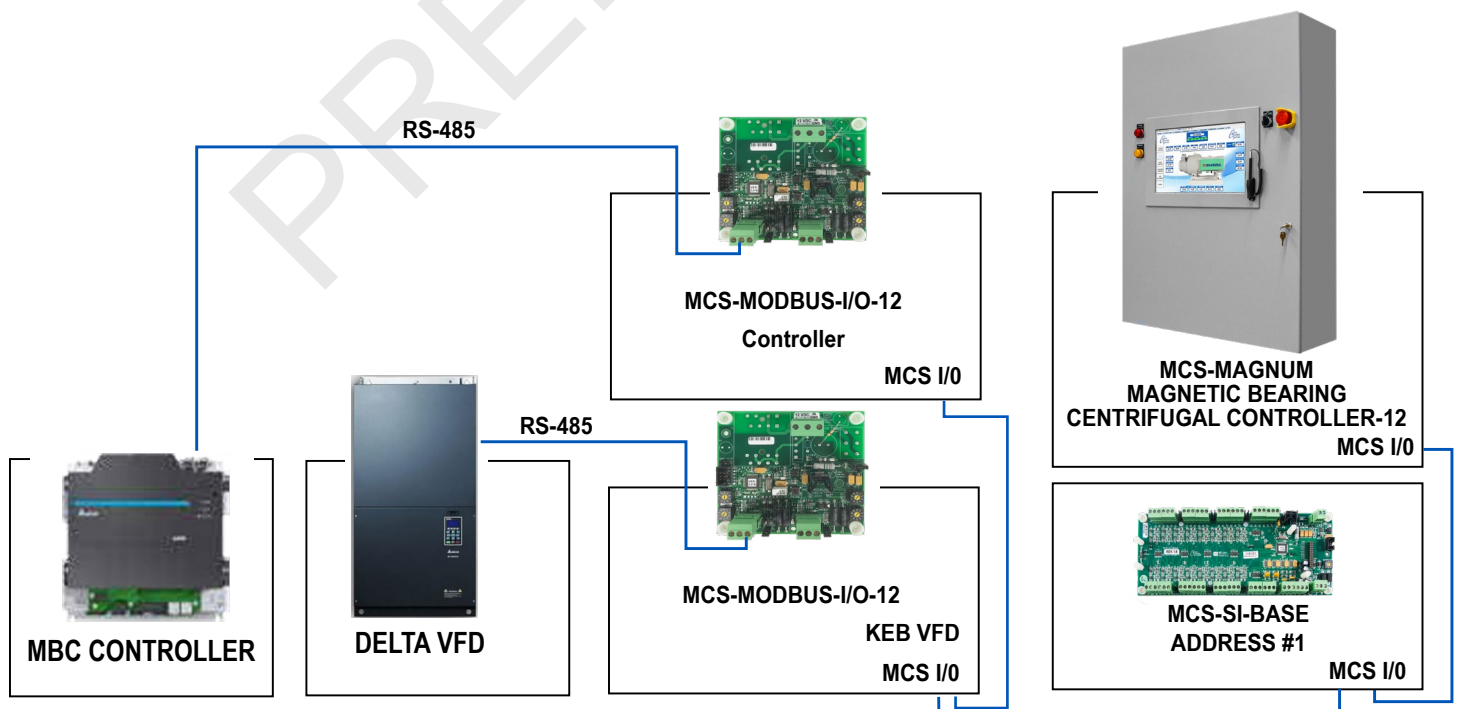
MCS-Magnum Magnetic Bearing Centrifugal Controller-12

MCS-MODBUS I/O-12

The **MCS-MODBUS-I/O** gives the MCS-MAGNUM the ability to act as a Modbus Master using the Modbus RTU Protocol over RS-485 network. This allows the **MCS-MAGNUM** to communicate to Modbus slave devices, (such as DELTA VFD Magnetic Bearing Controller and DELTA Variable Frequency Drive) to send and access parameters.

Screen capture from MCS-CONNECT showing DELTA VFD and data points being read by MCS-MAGNUM through the MCS-MODBUS I/O.

SI #	Sensor Inputs	Value	Manual Status	Filter/ Offset	Sensor Type	Last On/ MAX TDY	Last Off/ MIN TDY	Run TDY/ Avg TDY	Cycles TDY
3-1	VFD Fault	OFF	AUTO	0 / 0	MODBUS	-121:00:00	00:71:-5	371170:25:05	0
3-2	VFD Hertz	55.0	AUTO	0 / 0.0	MODBUS	102.3	0.0	4.7	
3-3	VFD KW	50.0K	AUTO	0 / 0.0K	MODBUS	50.0K	0.0K	1.1K	
3-4	VFD Amps	45.0A	AUTO	0 / 0.0A	MODBUS	45.0A	0.0A	39.2A	
3-5	VFD Volts	240.0V	AUTO	0 / 0.0V	MODBUS	240.0V	0.0V	1.9V	
3-6	VFD DC Bus	220V	AUTO	0 / 0V	MODBUS	2200V	0V	35V	
3-7	VFD HSink	32.0F	AUTO	0 / 0.0F	MODBUS	75.2F	0.0F	34.2F	
3-8	VFD CFault	0	AUTO	0 / 0	MODBUS	83	0	3	
3-9	VFD Fault1	0	AUTO	0 / 0	MODBUS	182	0	7	
3-10	VFD InMan	0	AUTO	0 / 0	MODBUS	215	0	9	
3-11	VFD FLTRST	0	AUTO	0 / 0	USER LOGIC	5132	0	115	
3-12	VFD RST HI	0	AUTO	0 / 0	USER LOGIC	1080	0	48	
3-13	VFD CMD	0c	AUTO	0 / 0c	USER LOGIC	0c	0c	0c	



Typical Control Components

15.4 TOUCHSCREEN

The **MCS-TOUCH-15.4** capacitive touchscreen interface designed to simplify user access with the MCS-Magnum 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.

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

Features include . . .

- **Graphic Interface**
- **Alarm History/Capture**
- **Expanded History**
- **Email Alarms with Diagnostic Save**
- **SMS Alarms**

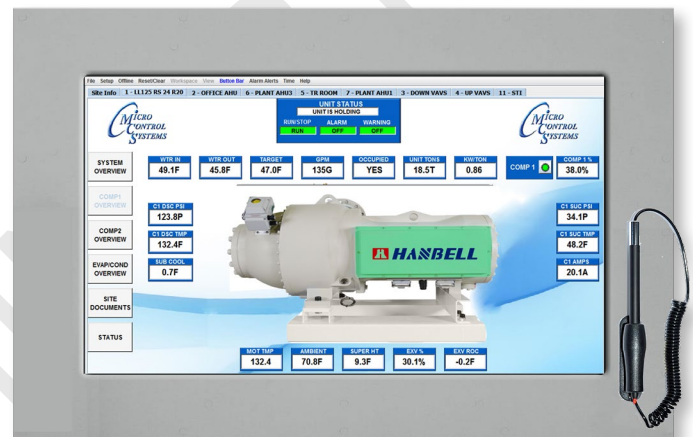
With Internet Connection:

The user is able to email 'ALARM ALERTS' back to a technician. The emails will include 'SAVE DIAGNOSTIC DATA' to help troubleshoot the alarm.

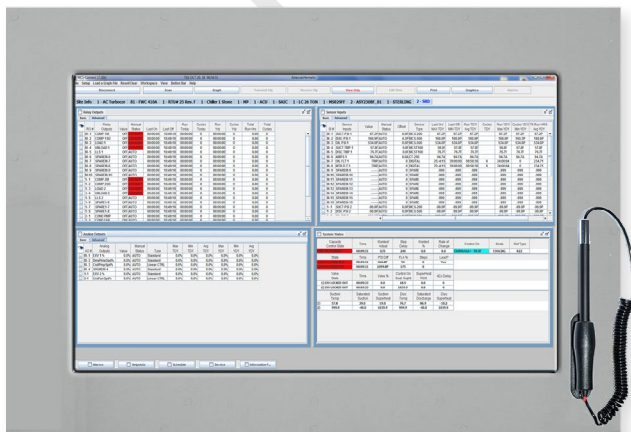
Also with the internet connection you can send 'SMS TEXT MESSAGES' with job site name and alarm, message only.

Without Internet Connection:

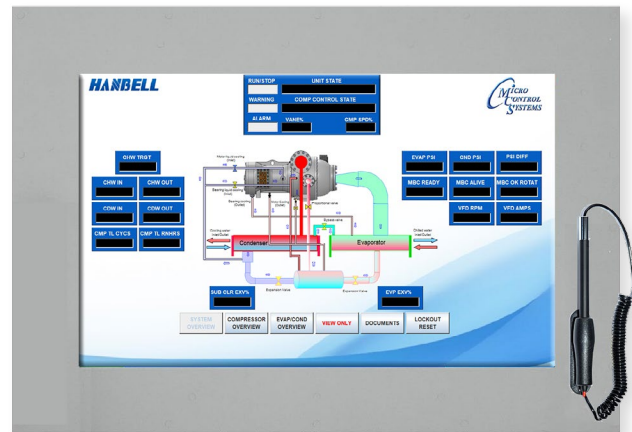
The user can save 'ALARM ALERT DATA' to a USB memory stick. Also, you can save 'EXTENDED HISTORY DATA' to a USB memory stick for troubleshooting. This can be done with or without internet connection.



- Freescale i.MX6 Dual Core 800mhz
- 2Gb of 512mhz DDR3 RAM memory
- 16Gb of eMMC Flash memory
- 10m/100m/1G Ethernet
- Micro-SD Slots
- 1 USB On-The-Go (OTG)
- 2 USB Host 2.0
- Real Time Clock (RTC) w/ Battery
- LVDS for 15.4" LCD 5-wire touch
- 3 RS485 communication ports



MCS-CONNECT STATUS SCREEN



MCS-RTM SYSTEM OVERVIEW SCREEN

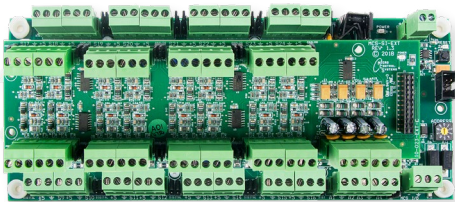
* The glove needs to have a conductive fabric or material to work with cap touchscreens.

Typical Control Components

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**.

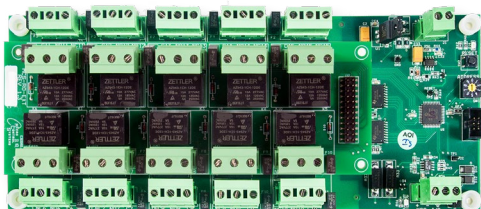
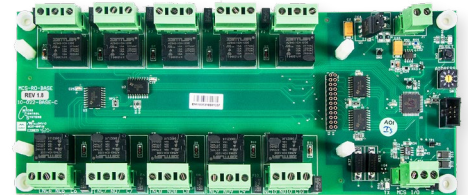
Each MCS-SI-EXT can be paired with a MCS-SI-BASE to double the number of inputs and outputs. Each

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.

Typical Control Components

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-200C

MCS-500C

MCS-EXV DRIVER

The **MCS-EXV-DRIVER-XX** is used for the positioning and control of bipolar expansion valves using an analog input of 0-10 VDC (0 VDC = 0% valve opening, 10 VDC = 100% valve opening).

The MCS-EXV-DRIVER-XX supports multiple electronic valve manufacturers including Sporlan, Alco, Danfoss and Carel. The MCS-EXV-DRIVER also supports overdriving on full opened and full closed voltage signals. The display decimal notifies when overdriving by blinking. Another advantage of using the MCS-EXV-DRIVER-XX is that it eliminates the need for having a liquid line solenoid. The MCS-EXV-DRIVER has capacitors that store enough power to close the valve when input power fails. The LED light indicates status of the internal backup supply and the on-time of the LED increases as the internal backup supply gets charged.



MCS-CT-750

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

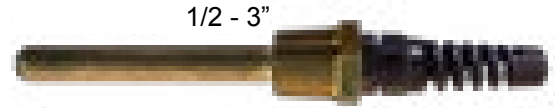
The MCS-CT series are the solid-core version, where the conductor runs through the sensor. No cutting, taping or rerouting is required. The current sensors are accurate, reliable, easy to install and require no service.



Typical Control Components

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 CVHE-F series chillers in the chilled water and condenser water lines. It comes pre-filled with heat conductive compound to aid in transferring temperature to the sensor.



1/2 - 3"



1/4 - 2.5"

The **MCS-TUBE** can be epoxied to a discharge or suction line on the CVHE-F 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-T100 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 1,000' 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-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.



MCS-SEHI/SERI

The **MCS-SEHI/SERI** are electronically operated step motor flow control valves, intended for the precise control of liquid refrigerant flow. Synchronized signals to the motor provide discrete angular movement, which translates into precise linear positioning of the valve piston. Valve pistons and ports are uniquely characterized, providing improved flow resolution and performance. The MCS-SEHI/SERI valves are easily interfaced with MCS microprocessor based controllers.

Standard Controller Points List

One Compressor - RTM

MCS-MAGNUM - BOARD - RELAY OUTPUTS

#	Output Name	Type	Description
M-1	VfdCabFans	User Logic	Relay for turning on and off VFD Cabinet Fans
M-2	EconoSol	Step w/ EXV	Relay to start EVV
M-3	Cmp1MtrInj	Standard	Compressor 1 Motor Injection
M-4	Cmp1AuxInj	Standard	Compressor 1 Motor Injection
M-5	VFD1Enable	User Logic	Relay for enabling VFD1 ON/OFF
M-6	MBCReset	User Logic	Used to reset MBC ON/OFF
M-7	SPAREM-7	Standard	Not Used - Reserved for Expansion
M-8	SPAREM-8	Standard	Not Used - Reserved for Expansion
M-9	Warning	Standard	Warning Light: unit is in a safety condition prior to a safety shutdown.
M-10	Alarm	Standard	Alarm Light: unit is in a safety shutdown

MCS-RO-BASE BOARD - RELAY OUTPUTS

1-1	MBC1Levita	Standard	Command to Levitate Compressor shaft
1-2	MBC1Rotate	Standard	Command to Rotate Compressor shaft
1-3	SPARE1-3	Standard	Not Used - Reserved for Expansion
1-4	SPARE1-4	Standard	Not Used - Reserved for Expansion
1-5	SPARE1-5	Standard	Not Used - Reserved for Expansion
1-6	SPARE1-6	Standard	Not Used - Reserved for Expansion
1-7	SPARE1-7	Standard	Not Used - Reserved for Expansion
1-8	SPARE1-8	Standard	Not Used - Reserved for Expansion
1-9	SPARE1-9	Standard	Not Used - Reserved for Expansion
1-10	SPARE1-10	Standard	Not Used - Reserved for Expansion

USER LOGIC - (VIRTUAL) - RELAY OUTPUTS

2-1	VFD1DlyRst	User Logic	Value in seconds used before resetting VFD ON/OFF
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MCS-MAGNUM BOARD - SENSOR INPUTS

#	Input Name	Type	Description
M-1	ChilWtrIn	MCST100	Chilled Water In Temperature
M-2	ChilWtrOut	MCST100	Chilled Water Leaving Temperature
M-3	CndWtrIn	MCST100	Condenser Water In Temperature
M-4	CndWtrOut	MCST100	Condenser Water Leaving Temperature
M-5	HGB%	User Defined	Measured the percentage of Hot Gas for turning ON/OFF solenoid
M-6	CoolerPSI	MCS-200	If Cooler temperature exceed the value of Setpoint for the time specified, a safety trip occurs.
M-7	CndLevel	User Defined	EXV valve will be opened and when it below the associated control point the EXVvalve will be closed.

Standard Controller Points List

One Compressor - RTM

MCS-MAGNUM BOARD - SENSOR INPUTS

#	Input Name	Type	Description
M-8	CndRefTmp	MCST100	Magnum checks for low Condenser refrigerant temperature
M-9	EvpRefTmp	MCST100	Magnum checks for low Evaporator refrigerant temperature
M-10	LiqRefPSI	MCS-500	Liquid Refrigerant Pressure - Compressor 1
M-11	LiqRefTemp	MCST100	Liquid Refrigerant Temperature - Compressor 1
M-12	VfdCabTmp	MCST100	Measured temperature of VFD cabinet
M-13	ChilWtrFlw	DIGITAL	Proof for Chilled Water Flow
M-14	CndWtrFlw	DIGITAL	Proof for Condenser Water Flow
M-15	Run/Stop	Digital. Open=Off	Run/Stop Hand Switch
M-16	Emg Stop	Digital. Closed=Off	Emergency Stop Switch

#1 MCS-SI-BASE BOARD - SENSOR INPUTS

1-1	MBC1 Error	MODBUS	Delta Warning Error
1-2	MBC1Levita	MODBUS	Compressor shaft Levitation Feedback Proof
1-3	MBC1Alarm	ModbusHex	Mag Bearing Controller 1 Alarm
1-4	MBC1Warn	ModbusHex	Mag Bearing Controller 1 Warning
1-5	MBC1FRBrg	MODBUS	Delta Front Radial Bearing
1-6	MBC1FTBrg	MODBUS	Delta Front Thrust Bearing
1-7	MBC1RTBrg	MODBUS	Delta Rear Trust Bearing
1-8	MBC1RRBrg	MODBUS	Delta Radial Bearing
1-9	MBC1 HZ	MODBUS	Mag Bearing Controller 1 Hertz
1-10	SPARE1-10	SPARE	Not Used - Reserved for Expansion
1-11	SPARE1-1	SPARE	Not Used - Reserved for Expansion
1-12	SPARE1-12	SPARE	Not Used - Reserved for Expansion
1-13	SPARE1-13	SPARE	Not Used - Reserved for Expansion
1-14	SPARE1-14	SPARE	Not Used - Reserved for Expansion
1-15	SPARE1-15	SPARE	Not Used - Reserved for Expansion
1-16	SPARE1-16	SPARE	Not Used - Reserved for Expansion

MCS-SI-EXT BOARD (mounted to #1 MCS-SI-BASE) - SENSOR INPUTS

2-1	VFD1AlmWrn	ModbusHex	Custom VFD Alarm logic
2-2	VFD1Status	ModbusHex	VFD1 Drive Status
2-3	VFD1Hz	MODBUS	VFD1 Output Frequency
2-4	VFD1Amps	MODBUS	VFD1 Output Amps
2-5	VFD1DCVolt	MODBUS	VFD 1 DC Bus Voltage

Standard Controller Points List

One Compressor - RTM

MCS-MAGNUM BOARD - SENSOR INPUTS

#	Input Name	Type	Description
2-6	VFD1ACVolt	MODBUS	VFD 1 AC Bus Voltage
2-7	VFD1RPM	MODBUS	VFD 1 Motor RPM
2-8	VFD1KW	MODBUS	VFD 1 Output Power (KW)
2-9	VFD1Temp	MODBUS	VFD 1 Drive Temperature
2-10	VFD1Ke	MODBUS	VFD 1 proportional relationship between motor speed and generated output voltage
2-11	SPARE2-11	SPARE	Not Used - Reserved for Expansion
2-12	SPARE2-12	SPARE	Not Used - Reserved for Expansion
2-13	SPARE2-13	SPARE	Not Used - Reserved for Expansion
2-14	SPARE2-14	SPARE	Not Used - Reserved for Expansion
2-15	SPARE2-15	SPARE	Not Used - Reserved for Expansion
2-16	SPARE2-16	SPARE	Not Used - Reserved for Expansion

MCS-SI-BASE BOARD - SENSOR INPUTS

3-1	MBC1WrnBtn	DIGITAL	Mag Bearing Controller Warning Reset Button
3-2	Cmp1SucTmp	MCST100	Cmp1 Suction Temperature
3-3	Cmp1DisTmp	MCST100	Cmp1 Discharge Temperature
3-4	Cmp1Vanes%	User Defined	Compressor 1 Vanes % Feedback
3-5	Cmp1Motor1	User Defined	Compressor 1 Motor Temperature 1
3-6	Cmp1Motor2	User Defined	Compressor 1 Motor Temperature 2
3-7	Cmp1Motor3	User Defined	Compressor 1 Motor Temperature 3
3-8	Cmp1Motor4	User Defined	Compressor 1 Motor Temperature 4
3-9	Cmp1Motor5	User Defined	Compressor 1 Motor Temperature 5
3-10	Cmp1Motor6	User Defined	Compressor 1 Motor Temperature 6
3-11	Cmp1LoPsi	MCS-200	Compressor 1 Suction Pressure
3-12	Cmp1HiPsi	MCS-500	Compressor 1 Discharge Pressure
3-13	Cmp1EcoPsi	MCS-500	Compressor 1 Economizer Pressure
3-14	C1EcoSucTp	MCST100	Compressor 1 Economizer Suction Temperature
3-15	MBC1RstBtn	DIGITAL	DIGITAL ON/OFF
3-16	ChwDiffPSI	User Defined	PSI SI CALCULATION

MCS-SI-EXT BOARD (mounted to #2 MCS-SI-BASE) - SENSOR INPUTS

4-1	Vfd1Contrl	User Logic	VFD1 ENABLE
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Standard Controller Points List

One Compressor - RTM

MCS-MAGNUM BOARD - SENSOR INPUTS

#	Input Name	Type	Description
4-2	VFD1Reset	User Logic	VFD1 RESET
4-3	Vfd1Cmnd	User Logic	VFD1 SI VALUE = VFD CONTROL
4-4	Cmp1HiMtTp	User Logic	VFD1 SI VALUE = COMPRESSOR1 MOTOR1
4-5	SPARE4-5	SPARE	Not Used - Reserved for Expansion
4-6	VfdOnOffst	User Logic	VFD SI VALUE = VFD FANS ON
4-7	SubCool1	User Logic	COMPRESSOR #1 SUB COOLING TEMP
4-8	EvpApr	User Logic	SI VALUE CHILLED WATER OUT
4-9	CndApr	User Logic	COMPRESSOR #1 SAT DISCHARGE TEMP
4-10	Cmp1SurgSp	User Logic	COMPRESSOR #1 SURGE SPEED
4-11	Cmp1PRatio	User Logic	COMPRESSOR #1 PRESSURE RATIO
4-12	Cmp1State	User Logic	COMPRESSOR #1 STATE
4-13	HiBrg1Tmp	User Logic	SI VALUE = MBC1 FRONT BEARING TEMP
4-14	Chl&CndFlo	User Logic	SI VALUE = CHILLED WATER FLOW
4-15	Vfd1Speed	User Logic	AO VALUE = VFD1 CONTROL SPEED
4-16	Unit State	User Logic	UNIT CHILLER = STATE

MCS-MAGNUM BOARD - Analog Outputs

M-1	EvpEXV%	Electronic Expansion Valve Control Signal
M-2	EcoVlv%	Economizer Valve %
M-3	IGV%	Inlet Guide Vane %
M-4	HGBypass%	Hot Gas Bypass %

#1 MCS-SI-BASE BOARD - Analog Outputs

1-1	MBCControl	Modbus write sent to compressor to levitate shaft
1-2	VFDHertz	Modbus write sent to compressor to control speed(Hertz)
1-3	VFDRunCmd	Modbus write sent to compressor to rotate shaft
1-4	VFDRstCmd	Modbus write sent to compressor to reset alarms

#1 MCS-SI-EXT BOARD (mounted to #1 MCS-SI-BASE) - Analog Outputs

2-1	CtlCmpSpd%	Control logic to calculate wanted %
2-3	SPARE	Not Used - Reserved for Expansion
2-4	SPARE	Not Used - Reserved for Expansion

Water Cooled 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

Company: _____ Phone: _____

Name: _____ Title: _____ Email: _____

Mobile: _____ Jobsite: _____

Chiller Manufacturer	Chiller Model Number	Chiller Serial Number	Refrigerant Type

How are the new controls from MCS provided: In MCS Control Enclosure Field mount new boards in existing cabinet

How many Circuits? _____ How many compressors per circuit? _____

1. Compressor Model(s): Comp #1: _____ Comp #2: _____ Comp #3: _____ Comp #4: _____

2. What is the compressor's Full Load Amps (FLA)? Comp #1: _____ Comp #2: _____ Comp #3: _____ Comp #4: _____

3. Does / Will unit have a refrigerant Level Sensor Yes No If no, MCS will control on Suction Superheat.

 If yes, is the Level Sensor located on: Evaporator Condenser

 Level Sensor Model: _____ Signal Output? _____

4. What model EXVS will you be using for: refrigerant level/superheat control? _____ How many EXVS? _____

5. Does / Will you be using a staging valve for each compressor? Yes No
(comes off the discharge of compressor BEFORE the check valve and goes back to suction side of compressor. Each compressor will have its own valve)

 If yes, what model valves? Comp #1: _____ Comp #2: _____ Comp #3: _____ Comp #4: _____

6. Does / Will you be using a (LBV) load balancing valve (aka hot gas valve) on the unit? Yes No
(comes off the discharge of compressor AFTER the check valve) If yes, what model valve? _____

7. Will MCS control the Condenser? Yes No Condenser type? _____

 If Water Cooled, Modulating Condenser Bypass Valve for pressure ratio control? Yes No

 If Air Cooled, Common Condenser? Yes No

 If yes, how many fans? _____ If no, how many fans per circuit? _____ VFD on first fan, per circuit? Yes No

8. Will MCS control the Evaporator? Yes No If yes, 1 or 2 pumps? _____ VFD's? Yes No

9. Is there an Economizer on this chiller? Yes No Type of Economizer? _____

 If 'None', what type of econo control used to the compressor? _____

(EXV modulated based on econo superheat(requires econo suct psi & Temp)

10. Will the unit be communicating to BMS? Yes No What Protocol will be used to BMS? _____

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

FILL OUT FORM - SAVE TO DESKTOP AND EMAIL TO sales@mcscontrols.com

The MCS Commitment

The founders of Micro Control Systems Inc. have been in the manufacturing of Microprocessor Controls their entire careers and have over eight decades of combined HVAC/R Microprocessor Controls experience. MCS was founded to meet the needs of the Utility and HVAC/R Industries with products based on the following design criteria:

- ◆ **Quality & Service**
 - ◆ **Cost Effectiveness**
 - ◆ **Ease of Use**

Our commitment is to provide practical solutions for the industries needs and to be both a leader and partner in the effective use of Microprocessor Controls.



Visit our web site at:
www.mcscontrols.com
For more information send email
to: **sales@mcscontrols.com**

Directions

- Interstate 75 to exit 139, West on Lockett Road
- Right at 1st light into Billy Creek Commerce Center
- Bear right with Enterprise Parkway
- Follow Enterprise as it parallels Interstate 75

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