

Tuesday, June 4, 2013

Attn: All model SACP rental customers, Smartech representatives and Authorized Service agents.

RE: Phase monitor relays installed on SACP rentalized packaged air conditioning units

All Smartech brand, model SACP rental units (Including models SACP20Q, SACP27Q, SACP40Q, SACP60Q, SACP65Q, SACP80Q, SACP40A-HS, and SACP80A-HS) are equipped with a phase monitor relay. This relay provides protection against under voltage, over voltage, phase rotation, and phase imbalance.

This relay is installed within the POWER section of the control panel (within the 208, 230, 460, or 575 voltage control panel). This panel is typically the left most panel (if the end user is facing the control panel). The relay (also referred to as the OVR, OUVR, or PMR) is equipped with a timer. To clarify, the phase monitor relay will not engage the control power side of the relay until the time has elapsed (typically 90 seconds). The phase monitor relay has an integral indicator light that has multiple color and flashing combinations to inform the user of under voltage, over voltage, incorrect phase rotation, and phase imbalance.



When a SACP rental unit is provided with clean power (with correct phasing) the phase monitor relay indicator light should be in a SOLID GREEN state.



After 90 seconds the control power light should be powered (on the outside of the control panel) if the ENABLE SWITCH is in the ON POSITION. If the control power light does not come on after 90 seconds it is recommended to check the status of under voltage, over voltage, incorrect phase rotation, and phase imbalance.



- Please take note that the POWER CONTROL panel of the SACP rental units should only be opened and reviewed by a licensed electrician and/or a factory authorized service representative. Electric shock and bodily harm can result from contact with any power components.

All current production SACP rental units are equipped with an ADDITIONAL PHASE ALARM / INCORRECT PHASE light on the outside of the 115V control panel door. This added light gives

the customer the ability to determine if incoming power is within acceptable ranges, without being exposed to the POWER control panel.

Sincerely,
Ryan M. Baker - Vice President of Equipment Sales

Wednesday, February 5, 2014

Attn: SACP 2012 and 2013 Customers

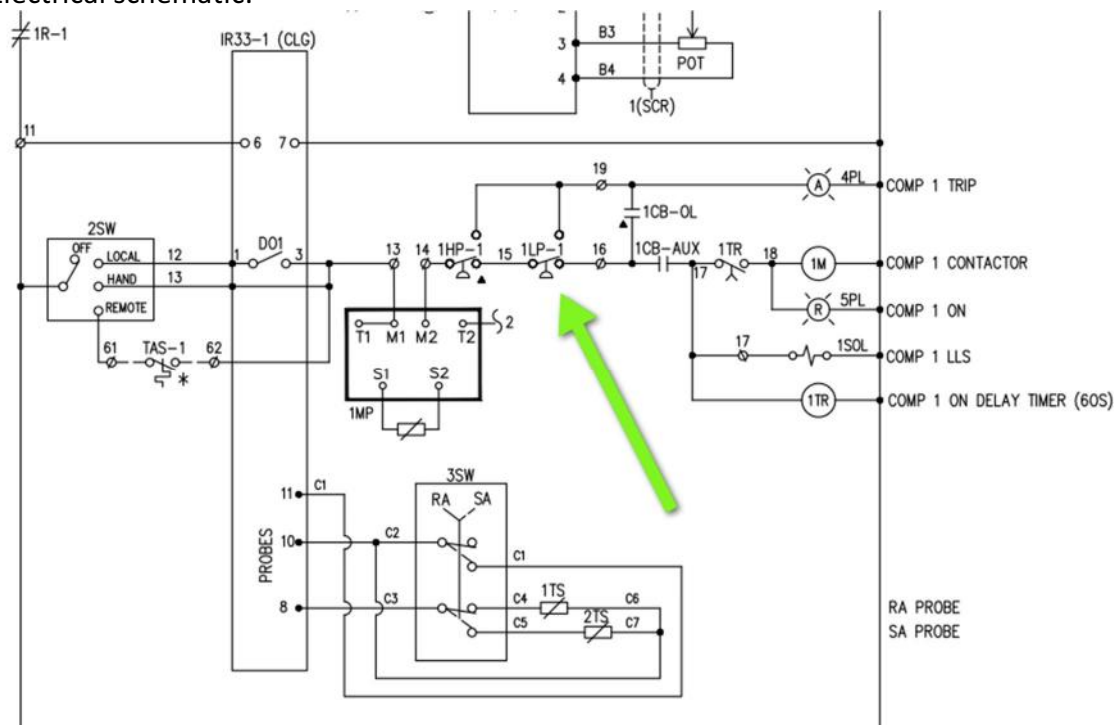
RE: Replacing automatically resetting low refrigerant pressure mechanical switches

All SACP rental air conditioning units are supplied with a low refrigerant pressure mechanical safety device. The low pressure safety device is designed to protect the compressor in case of low refrigerant pressure (or loss of refrigerant charge) and freezing of the evaporator coil.

In 2012 & 2013 many SACP rental units were manufactured with AUTOMATICALLY resetting low pressure switches. It is highly recommended by Smart Family that the automatically resetting devices are replaced with a MANUALLY resetting pressure switch.

In order to improve the reliability of the SACP units in the field, CRR/Smart Family will provide replacement manual type low pressure switch for each refrigerant circuit provided that the customer contact CRR/Smart Family by April 1st, 2014. Below is an explanation of how to identify which low pressure safety device is installed on an SACP unit and how to replace it with the proper switch:

Electrical schematic:



SACP Low Pressure Switch – Replacing AUTO with MANUAL switch

Automatically resetting device (device that is recommended to be replaced): Device is DANFOSS TYPE – Beige / Tan in color.



Manually resetting device (factory recommended device)P device is Johnson Controls TYPE - Blue/Gray in color:



Service Bulletins are designed to improve the overall reliability and dependability of all Smart Family units. It is recommended that only properly trained industry technicians work on Smart Family equipment and all standard safety practices be maintained.

SMART FAMILY OF COOLING PRODUCTS

www.SmartCoolingProducts.com

SmartFreeze



SmartHydronics



SmartRefrigeration



SmartBreeze



Smartech America



1118 First Street E, Humble TX 77338 p. 281.540.2805 / F. 281.540-8847

Sincerely,

Ryan M. Baker - Vice President of Equipment Sales



Wednesday, August 9, 2017

Revision 1: Dated March 20th, 2018 – added the 10,000 and 24,000 lbs D-ring

Attn: ASAs, REPs, and Rental Equipment customers

RE: Lift (D-ring) Ring bulletin for rental products

Many Smart Family of Cooling Products are designed with an overhead lifting option. The overhead lifting option is typically done in the form of a D-Ring (also referred to as a lift or hoist ring).

The hoist rings are secured with a mounting bolt. The torque spec for the bolt as noted below based upon the rating of the D-ring.

5,000 lbs rated D-ring: the torque spec is **100 ft/lbs**. It is the factories recommendation that the customer check the torque setting of each lift ring **prior to each lift**. Again, prior to lifting (every-time) all 4 lift ring bolts should be torqued to 100 ft/lbs.

10,000 lbs rated D-ring: the torque spec is **230 ft/lbs**. It is the factories recommendation that the customer check the torque setting of each lift ring **prior to each lift**. Again, prior to lifting (every-time) all 4 lift ring bolts should be torqued to 230 ft/lbs.

24,000 lbs rated D-ring: the torque spec is **800 ft/lbs**. It is the factories recommendation that the customer check the torque setting of each lift ring **prior to each lift**. Again, prior to lifting (every-time) all 4 lift ring bolts should be torqued to 800 ft/lbs.

Below are photos depicting various rental units and their lift rings (for reference).



All lift rings are 5:1, Magnetic Particle Inspected Per ASTM 1444, Minimum tensile strength of 180,000 psi, Hoist Rings retain the same rated load from 0 to 90 degrees from the bolt axis .

Smart Family Service Bulletin

2016 Bulletin

Service Bulletins are designed to improve the overall reliability and dependability of all Smart Family units. It is recommended that only properly trained industry technicians work on Smart Family equipment and all standard safety practices be maintained.



Smart Family can provide a data sheet for any lift ring used upon request. Smart Family can also provide a certificate of compliance for the lift rings, as well as a sample destruct report. If there are any additional questions, please contact technical support at (281) 540-2805.

Sincerely,

Ryan M Baker
VP Equipment Sales



Hoist Ring SAFETY INSTRUCTIONS

CAUTION: PRIOR TO USING ANY HOIST RING, PLEASE READ THE FOLLOWING FOR PROPER INSTALLATION AND USAGE.

As with all mechanical devices, regular inspection for wear and strict adherence to use instruction is necessary to prevent misuse failure.

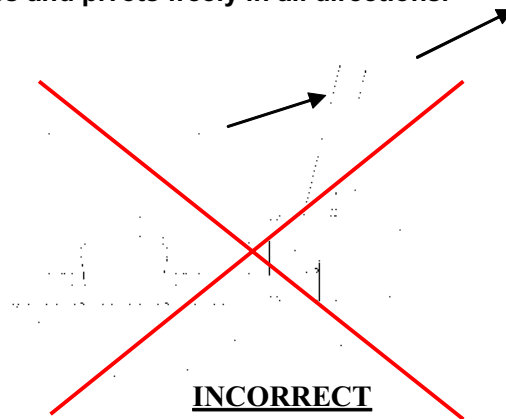
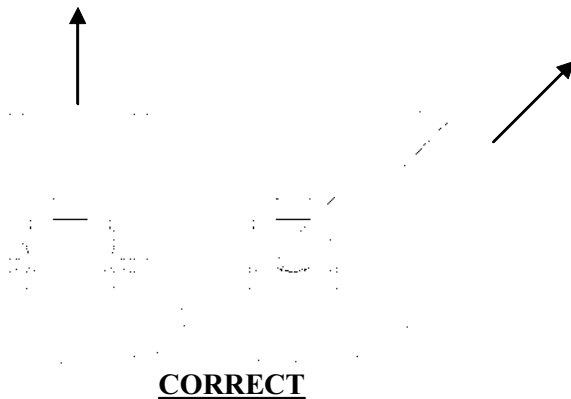
- Despite the 5:1 safety factor, NEVER EXCEED THE RATED LOAD CAPACITY. This safety margin is needed in case of misuse, which could drastically lower load capacity.

- Tensile strength of parent material should be above 80,000 PSI to achieve full load rating. For weaker material, consider through-hole mounting with a nut and washer on the other side.

- Tighten mounting screws to recommended torque. Periodically check torque because screws could loosen with extended service.

- AVOID SHOCK LOADING. Always lift gradually. Repeat magnetic particle inspection if shock loading ever occurs.

• After installation, always check that ring rotates and pivots freely in all directions.



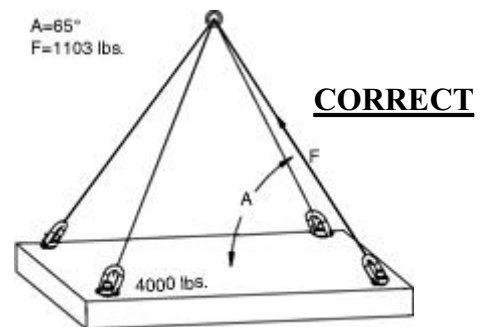
IMPORTANT! The force on each hoist ring is not just the total weight divided by the number of hoist rings. The force will be greater at lower lift angles. Make sure load is evenly distributed. See below.
Formula with example data: $F = \frac{W}{N \sin A}$

F = Force on each hoist ring
W = Total weight = 4000 lbs.
N = Number of hoist rings = 4
A = Lifting angle

Safe
Fig. 1

$$A = 65^\circ$$

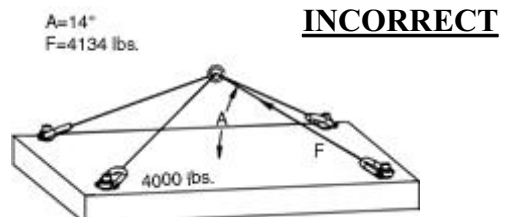
$$F = 4000 / 4 \sin 65^\circ = 1103 \text{ lbs.}$$



Unsafe
Fig. 2

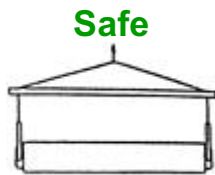
$$A = 14^\circ$$

$$F = 4000 / 4 \sin 14^\circ = 4134 \text{ lbs.}$$

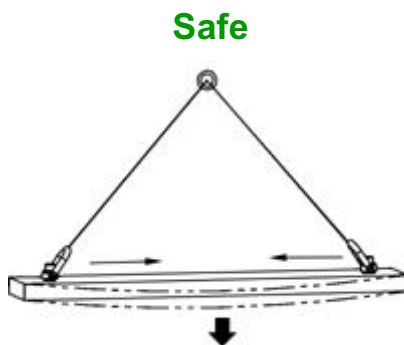




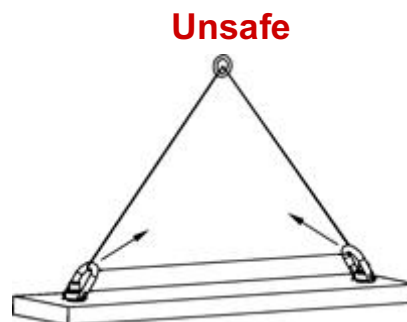
2. Never exceed the rated load capacity of the hoist ring.
3. Tensile strength of material to be lifted should be at least 80,000 PSI for full load rating. For lower tensile materials, increase thread length or use a through hole with a nut and washer on other side.
4. Do not allow hoist rings to bind. If necessary use a spreader bar to avoid binding. See example below.



5. Spacers should not be used between the hoist ring and the mounting surface.
6. Mounting surface must be flat and smooth for full contact with the safety hoist ring. Tapped mounting holes must be perpendicular to the mounting surface.
7. Mounting screws should be tightened to the recommended torque. Torque should be checked periodically as bolts could loosen in extended service.
8. Never lift with any device, such as hooks, chains or cables that could spread or damage the bail.
9. Never apply shock loads and use good lifting practices. Always lift gradually. If shock loading ever occurs, the safety lifting device should be magnetic particle inspected.
10. After installation, always check that ring rotates and pivots freely in all directions.



After slings have been properly attached to the hoist ring, apply force slowly. Make sure the bail is parallel to the direction of the load. Watch the load and be prepared to stop applying force if the load starts buckling.



Slings should not be reeved from one bail to another.



Rev. 0

Certificate of Compliance

ADB® HEAVY DUTY® WELD MOUNT HOIST RINGS

ADB's QUALITY SYSTEM IS REGISTERED TO ISO 9001-2008

The material used in our ADB® Heavy Duty® Weld Mount Hoist Ring Components is AISA-SAE 4140 or equivalent and conforms to AMS-6382 and ASTM A 322.

CHEMICAL ANALYSIS

Carbon	.38/.43	Silicon	.15/.35
Manganese	.60/.85	Chromium	.90/1.20
Phosphorus	.030/Max	Molybdenum	.15/.30
Sulfur	.030/Max		

ADB® Heavy Duty® Weld Mount Hoist Rings are designed with a design factor of five times the rated capacity based in any lifting direction. However, the user is reminded that it should not be used to lift loads that exceed the rated capacity.

If any component or components of the hoist ring is replaced with a non-ADB® component, this certification is void.

ADB® Heavy Duty® Weld Mount Hoist Rings are designed to exceed the following military specifications and ASME standards:

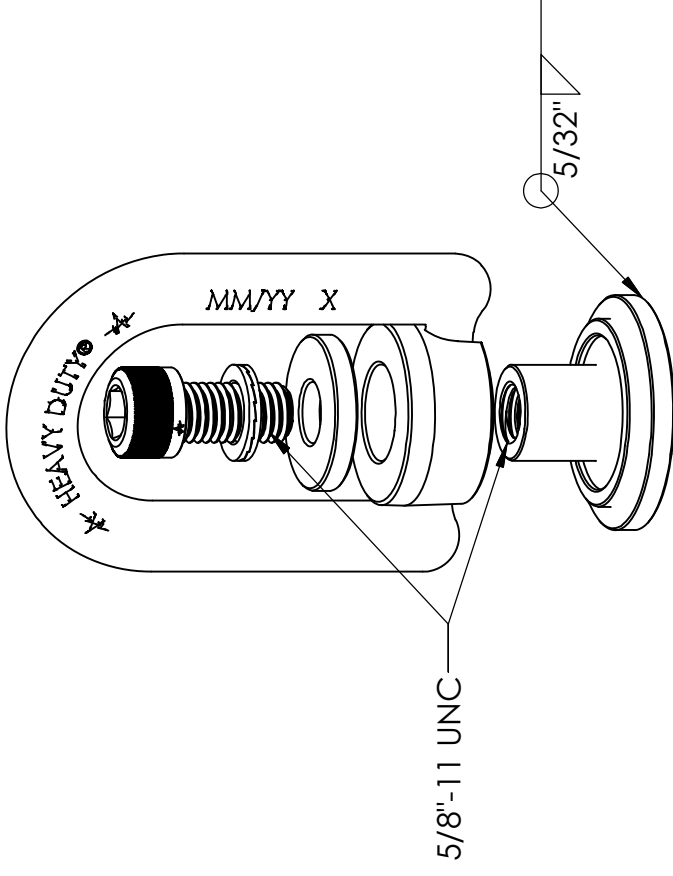
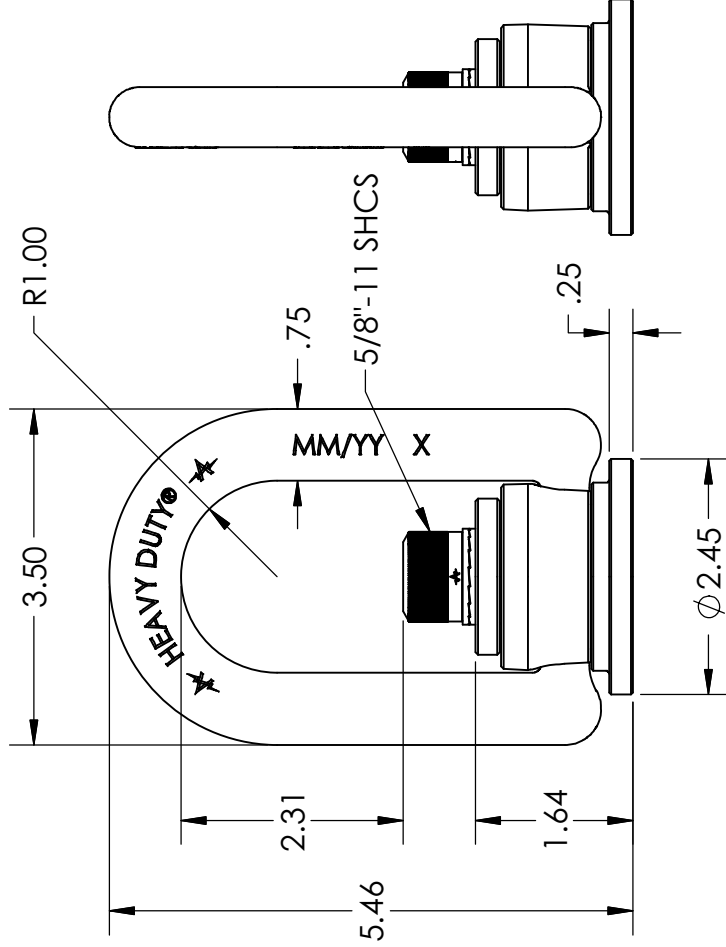
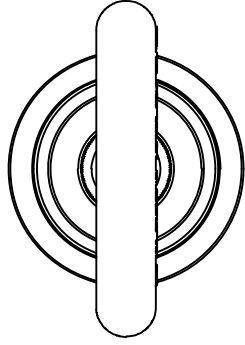
MIL-STD-1365	General design criteria for handling equipment associated with weapons systems.
MIL-STD-209	Slings and tie down provisions for lifting and tying down military equipment.
ASME B30.26	Safety Standards for cableways, cranes, derricks, hoists, hooks, Jacks and slings.

- The surface finish of ADB® Heavy Duty® Weld Mount Hoist Rings is Black Oxide per MIL-DTL-13924.
- ADB® Heavy Duty® Weld Mount Hoist Rings are magnetic particle inspected in accordance with ASTM E 1444.
- ADB's Heavy Duty® Weld Mount Hoist Rings are not exposed to any equipment or material known or suspected of having Mercury or Polychlorinated Biphenyls (PCB's).
- ADB® Heavy Duty® Weld Mount Hoist Rings are heat treated to 36-48 Rc per MIL-H-6875.
- Screws and stud assemblies are produced from 180,000 PSI minimum tensile strength material.

W.A.

Wes Anderson
Quality Assurance and Engineering

5740 Hunt Rd. Valdosta, GA 31606
(229) 253-8928 1-800-423-4425 Fax: (229) 253-8929
www.adbhoiststrings.com



Hoist Ring Specifications:

- Material: 4140 alloy steel
- Minimum material strength is 180 ksi
- Critical components 100% NDT Inspected
- Finish: Black oxide

Welding Recommendations:

- Unassemble hoist ring prior to welding.
- Use electrode E70S-2 or E70S-6 for GTAW.
- Clamp or hold down bushing flange to mounting surface.
- Preheat bushing flange and mating surface area to 110 °F.
- Weld bushing flange to surface and inspect.
- Apply Loctite 271 to SHCS threads.
- Reassemble hoist ring with wedge lock washer and torque bolt to 100 ft-lbs.

WORKING LOAD LIMIT: 5,000 lbs
REQUIRED TORQUE: 100 ft-lbs

DIMENSIONS ARE FOR REFERENCE ONLY

FOR MORE INFORMATION
 VISIT OUR WEBSITE:
www.adbhoistings.com

YOU CAN ALSO CONTACT US AT:
 PHONE: (800) 423-4425
 FAX: (229) 253-8929
 EMAIL: adb@adbhoistings.com

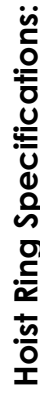
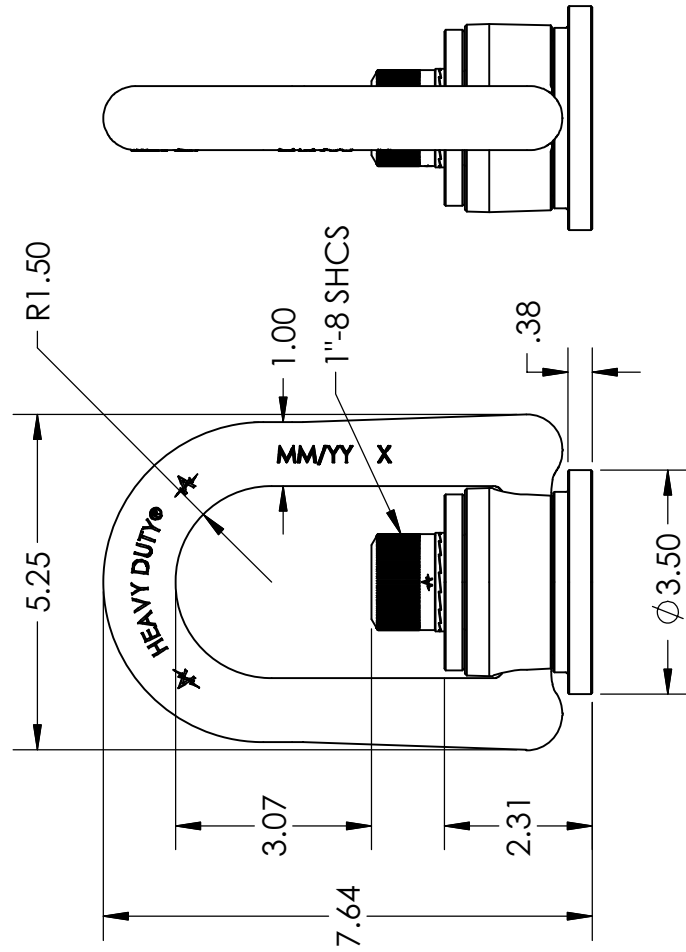


PART DESCRIPTION
 Special Heavy Duty
 Weld Mount Hoist Ring

SIZE
A

PART NO.
 X36640-PERMANENT
 INSTALLATION


REV
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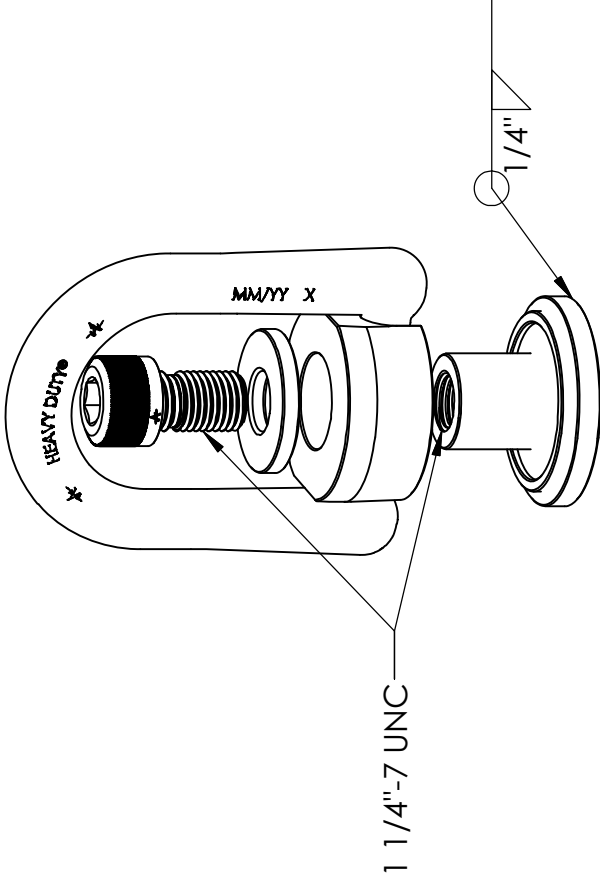
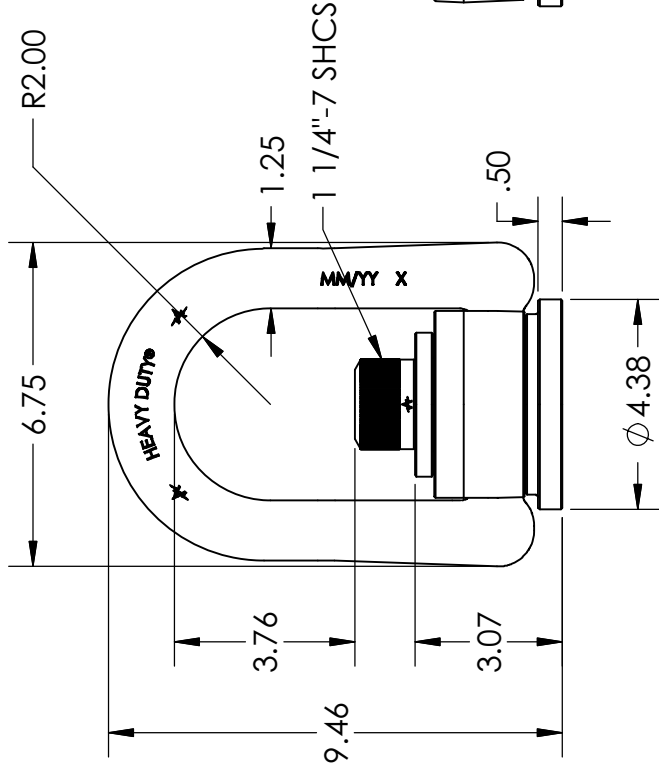
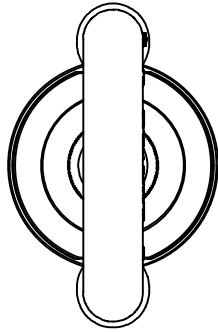


- Material: 4140 alloy steel
- Minimum material strength is 180 ksi
- Critical components 100% NDT Inspected
- Finish: Black oxide

Welding Recommendations:

- Unassemble hoist ring prior to welding.
- Use electrode E70S-2 or E70S-6 for GTAW.
- Clamp or hold down bushing flange to mounting surface.
- Preheat bushing flange and mating surface area to 110°F.
- Weld bushing flange to surface and inspect.
- Apply Loctite 271 to SHCS threads.
- Reassemble hoist ring with wedge lock washer and torque bolt to 230 ft-lbs.

<p>WORKING LOAD LIMIT: 10,000 lbs</p> <p>REQUIRED TORQUE: 230 ft-lbs</p>	<p>FOR MORE INFORMATION VISIT OUR WEBSITE: www.adbhoistings.com</p> <p>YOU CAN ALSO CONTACT US AT: PHONE: (800) 423-4425 FAX: (229) 253-8929 EMAIL: adb@adbhoistings.com</p>	 <p>ADB Hoist Rings <small>Mfg.</small></p> <p>5740 HUNT RD. VALDOSTA, GA 31606</p>	<p>PART DESCRIPTION</p> <p>Special Heavy Duty Weld Mount Hoist Ring</p>	<p>REV</p> <p>-</p>
			<p>SIZE</p> <p>A</p>	<p>PART NO.</p> <p>X36645-PERMANENT INSTALLATION</p>
<p>DIMENSIONS ARE FOR REFERENCE ONLY</p>				



Hoist Ring Specifications:

- Material: 4140 alloy steel
- Minimum material strength is 180 ksi
- Critical components 100% NDT Inspected
- Finish: Black oxide

Welding Recommendations:

- Unassemble hoist ring prior to welding.
- Use electrode E70S-2 or E70S-6 for GTAW.
- Clamp or hold down bushing flange to mounting surface.
- Preheat bushing flange and mating surface area to 110°F.
- Weld bushing flange to surface and inspect.
- Reassemble hoist ring and torque bolt to 800 ft-lbs.

WORKING LOAD LIMIT: 24,000 lbs
REQUIRED TORQUE: 800 ft-lbs

DIMENSIONS ARE FOR REFERENCE ONLY

FOR MORE INFORMATION
 VISIT OUR WEBSITE:
www.adbhoistings.com

YOU CAN ALSO CONTACT US AT:
 PHONE: (800) 423-4425
 FAX: (229) 253-8929
 EMAIL: adb@adbhoistings.com



PART DESCRIPTION
 Heavy Duty Weld Mount
 Hoist Ring

SIZE
A

PART NO.
36650

REV
 -

Line Reactors and AC Drives

Rockwell Automation
Mequon Wisconsin

Quite often, line and load reactors are installed on AC drives without a solid understanding of why or what the positive and negative consequences are for adding this piece of hardware. The purpose of this document is to provoke some thought on the part of the person(s) responsible for the successful installation of the drive, and to provide some guidelines as to if, where and when a reactor is needed and what size reactor to use.

What Is A Reactor:

Let's first define what a reactor is. Essentially a reactor is an inductor. Physically it is simply a coil of wire that allows a magnetic field to form around the coil when current flows through it. When energized, it is an electric magnet with the strength of the field being proportional to the amperage flowing and the number of turns. A simple loop of wire is an air core inductor. More loops give a higher inductance rating. Quite often some ferrous material such as iron is added as a core to the winding. This has the effect of concentrating the lines of magnetic flux there by making a more effective Inductor.

Going back to basic AC circuit theory, an inductor has the characteristic of storing energy in the magnetic field and is reluctant to a change in current. The main property of a reactor is its inductance and is measured in henrys, millihenrys or microhenrys. In a DC circuit (such as that of the DC bus in an AC drive), an inductor simply limits the rate of change of current in the circuit since current in an inductor wants to continue to flow at the given rate for any instant in time. That is to say, an instantaneous increase or decrease in applied voltage will result in a slow increase or decrease in current. Conversely, if the rate of current in the inductor changes, a corresponding voltage will be induced. If we look at the equation $V = L (di/dt)$ for an inductor where V is voltage, L is inductance and (di/dt) is the rate of change of current in amps per second, we can see that a positive rise in current will cause a voltage to be induced. This induced voltage is opposite in polarity to the applied voltage and proportional to both the rate of rise of current and the inductance value. This induced voltage subtracts from the applied voltage thereby limiting the rate of rise of current. This inductance value is a determining factor of the reactance. The reactance is part of the total impedance for an AC circuit. The equation for the reactance of an inductor is $X_L = 2\pi FL$. Where X_L is inductive reactance in Ohms, F is the applied frequency of the AC source and L is the inductance value of the reactor. As you can see, the reactance and therefor the impedance of the reactor is higher with a higher inductance value. Also, a given inductance value will have a higher impedance at higher frequencies. Thus we can say that in addition to limiting the rate of rise in current, a reactor adds impedance to an AC circuit proportional to both its inductance value and the applied frequency.

Side-Effects of adding a Reactor:

Like most medication there are side-effects to using a reactor. Though these issues should not prevent the use of a reactor when one is required, the user should be aware of and ready to accommodate these effects. Since a reactor is made of wire (usually copper) wound in a coil, it will have the associated losses due to wire resistance. Also, if it is an Iron core inductor (as in the case of most reactors used in power electronics) it will have some "eddy current" loss in the core due to the changing magnetic field and the iron molecules being magnetically realigned. In general a reactor will add cost and weight, require space, generate heat and reduce efficiency.

Sometimes the addition of a line reactor can change the characteristics of the line you are connected to. Other components such as power factor correction capacitors and stray cable capacitance can interact with a line reactor causing a resonance to be set up. AC drives have exhibit a relatively good power factor and do not require the use of correction capacitors. In fact, power factor correction capacitors often do more harm than good where AC drives are present. For the most part, power factor correction capacitors should never be used with a drive. You may find that the addition of a reactor completes the required components for a line resonance where none previously existed, especially where power factor correction capacitors are present. In such cases either the capacitor or the inductor must be removed.

Furthermore, reactors have the effect of dropping some voltage, reducing the available voltage to the motor and or input of the motor drive.

One might ask; With all these side effects, why use a reactor? If you ask that question you might hear a whole slew of answers ranging from, "That's the way we always do it" to "I'd rather be safe than sorry." The fact is there are good reasons to install a reactor under certain conditions. Let's start with the input side of a drive.

A Reactor at the Input to reduce Harmonics:

As you may already know, most standard "six pulse" drives are nonlinear loads. They tend to draw current only at the plus and minus peaks of the line. Since the current wave-form is not sinusoidal the current is said to contain "harmonics". For a standard 3 phase input converter (used to convert AC to DC) using six SCR's or six diodes and a filter capacitor bank as shown in figure 1a below, the three phase input current may contain as much as 85% or more total harmonic distortion. Notice the high peaks.

3 Phase Input

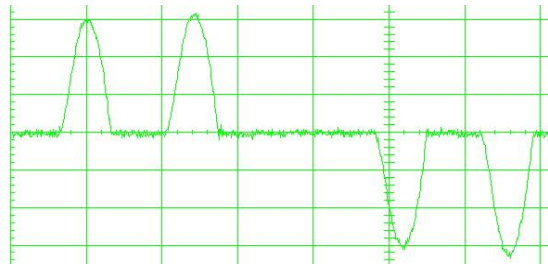
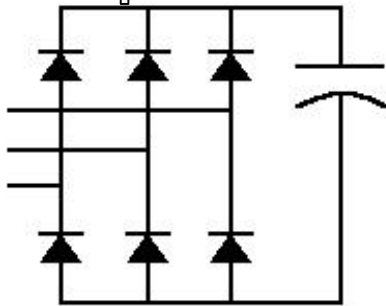


Figure 1a No reactor

3 Phase Input

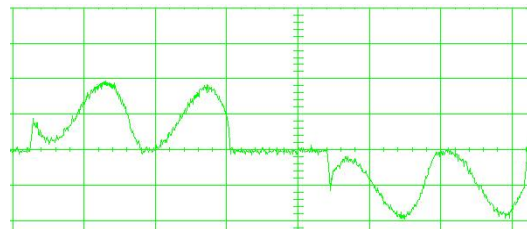
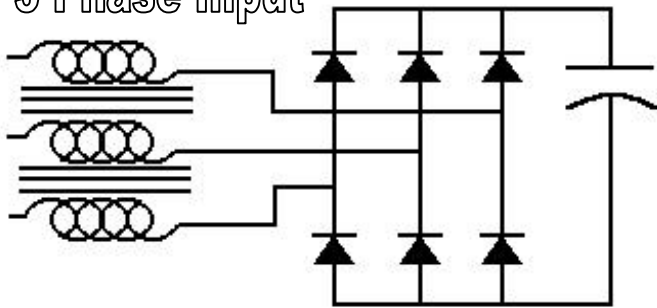


Figure 1b AC Line reactor

3 Phase Input

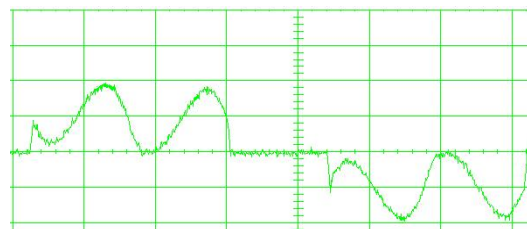
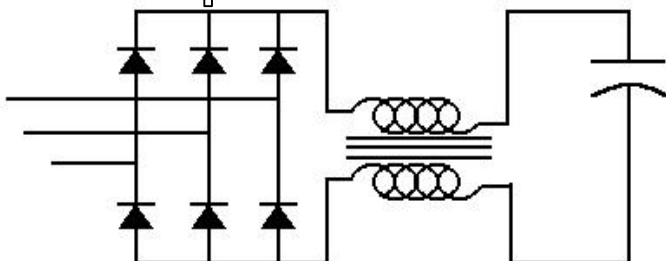


Figure 1c DC Link reactor

If a line reactor is installed as in figure 1b, the peaks of the line current are reduced and somewhat broadened out. This makes the current somewhat more sinusoidal, lowering the harmonic level to around 35% when a properly sized reactor is used. This effect is also beneficial to the DC filter capacitors. Since the “ripple current” is reduced. The capacitors can be smaller, run cooler and last longer. Though harmonic mitigation is an important reason to use a line reactor, most drives at the 10 horsepower rating and above include a “DC link choke” as seen in figure 1c. The link choke is a reactor put in the DC bus between the Rectifier bridge and the capacitor bank. It can provide the necessary harmonic mitigation and since it is in the DC bus, it can be made smaller and cheaper than the 3 phase input reactor.

Small Drives may need an Input Reactor:

Generally drives less than 10 hp do not have a dc link reactor. And in most cases that's not a problem since any harmonic current distortion would be small when compared to the total load of the facility. If many small drives are required for a process, an input reactor is a valid method in reducing harmonics. In the case of many small drives, it is often more economical and practical to connect a group of 5 to 10 drives through one large three phase reactor as shown in figure 2.

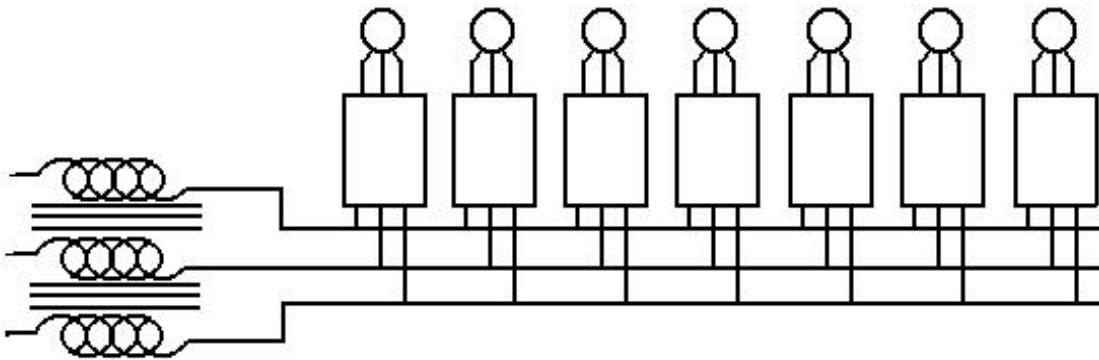


Figure 2

If there was ever a mandate to install an input reactor, it may be on a small drive where the transformer feeding it might be 20 times or more of the current or power rating of the drive. In some cases a large transformer (one with a low source impedance and or high short circuit capability) feeding a relatively small drive can result in overheating of the drive internal DC capacitor bank. When an NTC (negative temperature coefficient) pre-charge system is used, a large transformer feeding the drive can result in excessive inrush and clear line fuses or damage the drive. An input line reactor here will help. In this case, the reactor reduces harmonic current but the real reason for its' presence is to limit the peak current that will flow at the input and in the capacitor bank.

A Reactor as a line voltage buffer:

In some cases, other switch gear on the line such as contactors and disconnects can cause line transients, particularly when inductive loads such as motors are switched off. In such cases, a voltage spike may occur at the input to the drive that could result in a surge of current at the input. If the voltage is high enough, a failure of the semiconductors in the DC converter may also result. Sometimes a reactor is used to “Buffer from the line”. While a DC link choke, if present, will protect against a current surge, it cannot protect the converter from a voltage spike since a link choke is located after the converter (refer to figure 1c). The Semiconductors are exposed to whatever line voltage condition exists. For this reason a reactor at the input to the drive may be of some help, but a better solution would be to attenuate the voltage spike at the source with a snubber circuit. Figure 3 shows both methods being used to protect the drive input semiconductors.

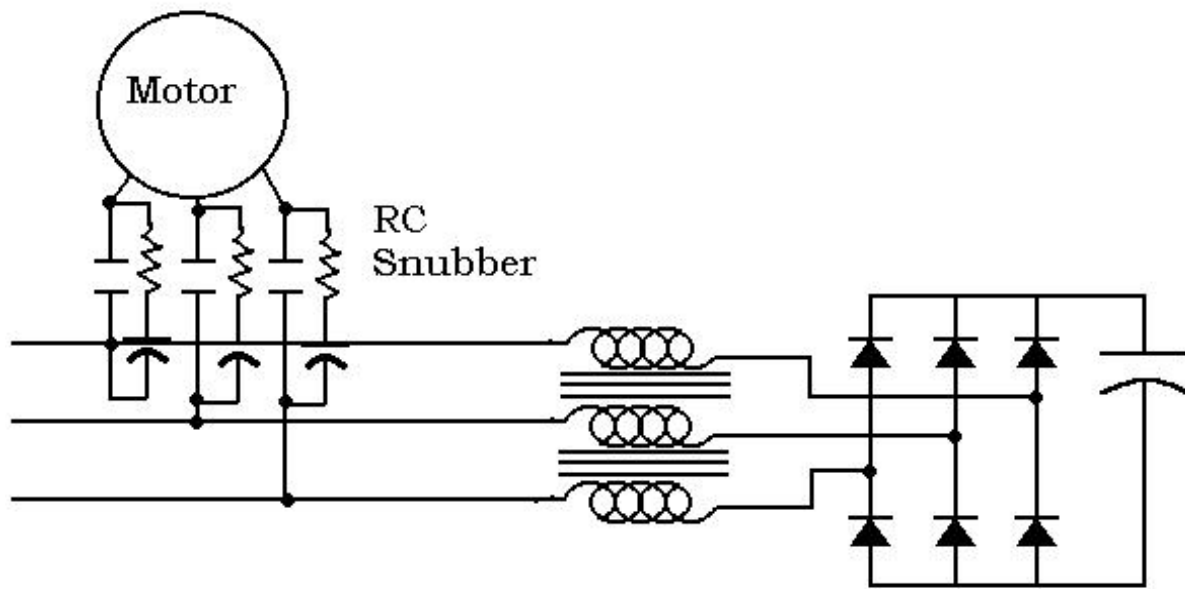


Figure 3

A reactor does not fix grounding issues nor does it provide isolation. Keep in mind that while a reactor provides some buffering, it does not provide isolation and can not take the place of an isolation transformer. If isolation is needed, an isolation transformer must be used. Contact your distributor for an appropriately sized transformer. Also, it must be stated that while a reactor can provide light buffering from a short duration (less than 1 ms) transient condition, it will not fix a high line condition or protect against line swells (high line for several line cycles). Nor should it be expected to protect against high energy short duration events such as lightning strikes.

Reactors at the drive output to increase load inductance:

Applying a reactor at the output of a drive is sometimes necessary. Again, all of the “side-effects” as previously stated hold true. And yes, there are a few instances when it may be necessary to add load impedance by inserting an output reactor. If the motor has a “low leakage inductance” a reactor can help bring the total load inductance back up to a level that the drive can handle. In the days of the “Bipolar transistor” drive, carrier frequencies rarely exceeded 1.5Khz. This meant that the transistor “On time” was much longer. This allowed current to ramp up higher, limited by the load or motor inductance. The result of a low inductance motor was huge ripple current that sometimes ran into the current limit of the drive causing poor performance or tripping. For the most part, the higher carrier frequencies and correspondingly lower ripple current of today’s IGBT (Isolated Gate Bipolar Transistor) drives have eliminated the need to add inductance to the load. Refer to the comparison in figure 4.

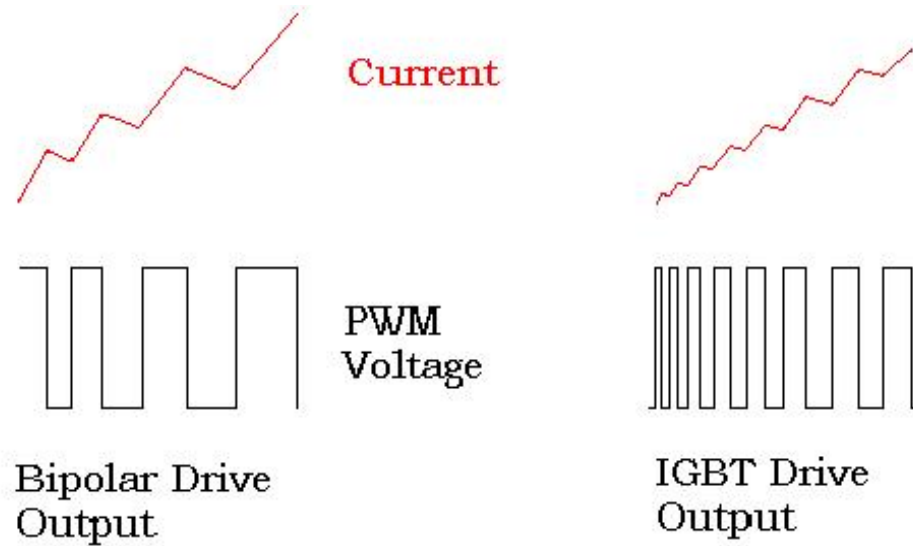


Figure 4

In some rare cases where a strange motor configuration or a motor with 6 or more poles is used, the motor inductance may be too low and a reactor may be needed. Running multiple motors on one drive may also result in a low inductance load and the requirement of an output reactor.

Reactors at the drive output to reduce the effect of reflected wave:

A reactor at the output of a drive is sometimes installed in order to prevent a reflected wave voltage spike when long motor leads are required. This is not always a good practice. Though the reactor will slope off the voltage rise time providing some benefit, it is not likely to limit the peak voltage at the motor. In some cases, a resonance can be set up between the cable capacitance and reactor that causes even higher voltages to be seen at the motor. In general, a motor terminator is a better solution. If a reactor is installed at the output, it is most likely part of a specially designed "reflected wave reduction" device that also has damping resistors in parallel. If a reactor is used at the output, it should be located as close to the drive end as is possible. Figure 5 shows the motor voltage before and after the installation of a reactor. The DC bus voltage is shown for reference. Notice that the rise times are different, the peak voltage is about twice the DC bus voltage regardless of the use of a reactor.

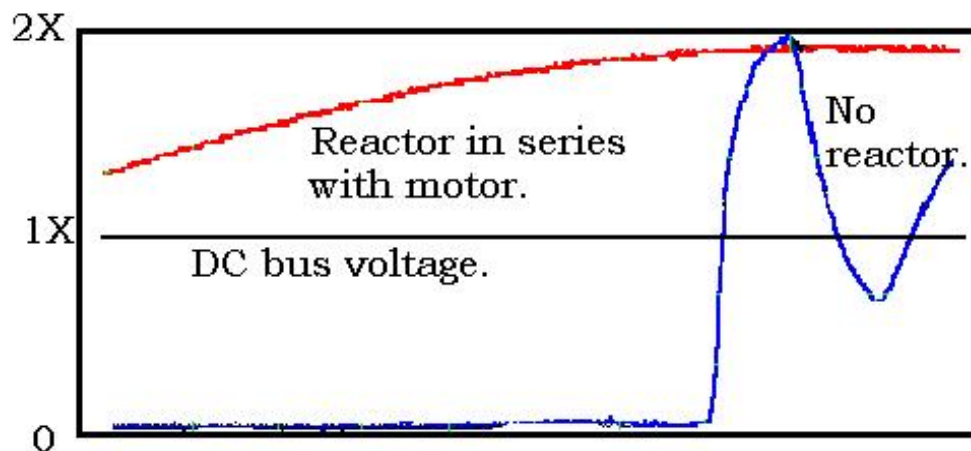


Figure 5

Since a current regulated drive requires “voltage margin” to regulate current, the output voltage is already limited by about 5%. Adding a reactor at the output will drop the voltage even further. A reactor at the output of this type of drive may not be a problem so long as the application can run without full motor voltage near full speed (typically 55 to 60 hertz). In some cases a specially wound motor may be used to compensate. For example a 460 volt 150 amp motor may be rewound as a 400 volt 175 amp motor.

Sizing a reactor:

The first rule is make sure you have a high enough amp rating. In terms of the impedance value, you will usually find that 3% to 5% is the norm with most falling closer to 3%. A 3% reactor is enough to provide line buffering and a 5% reactor would be a better choice for harmonic mitigation if no link choke is present. Output reactors, when used, are generally around 3%. This % rating is relative to the load or drive where the reactor impedance is a % of the drive impedance at full load. Thus a 3% reactor will drop 3% of the applied voltage at full rated current. To calculate the actual inductance value we would use the following formula. $L = X_L / (2\pi FL)$ Where L is inductance in Henrys, X_L is inductive reactance or impedance in Ohms and F is the frequency. In general Frequency will be the line frequency for both input and output reactors.

Your drive distributor should be able to help you size a reactor for use with a drive. If you wish to calculate the value yourself, the following example may be helpful. If a 3% reactor was required for a 100 amp 480 volt drive, a 100 amp or larger current rating would be required. The drive impedance would be: $Z = V/I$ or $480/100 = 4.8$ ohms. $3\% \times 4.8 \text{ ohms} = 0.114$ ohms inserting this 0.114 impedance in the equation for inductance we get a value of about 300 Microhenrys.

Summary:

A reactor is not a magic wand or a silver bullet but can prevent certain problems when applied properly. For the most part, a reactor at the input or output is not automatically required. Reactors can be helpful in providing some line buffering or adding impedance especially for drives with no DC link choke. For small drives they may be needed to prevent inrush or provide reduction in current harmonics when many small drives are located at one installation. At the output they should only be used to correct low motor inductance and not as a motor protection device.

Use a reactor:

- ✓ To add Line Impedance.
- ✓ To provide some light buffering against low magnitude line spikes.
- ✓ To reducing Harmonics (When no link choke is present).
- ✓ To compensating for a low inductance motor.
- ✓ Only as part of a filter for reflected wave reduction.



Friday, June 19, 2015

Attn: SACP Rental unit customers – Applicable to all models

RE: Change of motor protection modules in certain SACP units and replacement compressors.

Almost all Smart Family (Smartech brand) SACP rental air conditioning units have a motor protection module device installed. The MPM is a safety device located within the compressor pecker head. Recently, Copeland has changed the type of motor protection devices used. Newer model compressors now come with a CORESENSE module. Please see the details and differences between the two below.

Sincerely,

Ryan M Baker
VP Equipment Sales

Kriwan to CoreSense™ Communications retrofit instructions

Kriwan has discontinued production of the INT69 SC2® motor protector module that has been used with 20 to 40 ton Copeland Scroll™ compressors. Kriwan modules that require replacement in field applications should be replaced with a CoreSense Communications module. The purpose of this bulletin is to provide instructions on how to perform a Kriwan to CoreSense Communications retrofit. Please refer to the Kriwan, CoreSense, and compressor model numbers listed in the table below.

Kriwan Module Part Number	Replacement CoreSense kit Number	Module Voltage	Compressor Model Numbers
071-0649-01	998-0331-00	24 VAC	ZR250-380KCE-TW*
071-0649-00	998-0330-00	120/240 VAC	ZP235-485KCE-TW*

Kriwan modules that are deemed non-operational and in-warranty should be returned through the normal channel for warranty purposes. Kriwan modules that are non-operational and out of warranty should be field scrapped in the appropriate manner. If you have any questions, please contact your Emerson Climate Application Engineer or visit Emerson's Online Product Information (OPI) located at **EmersonClimate.com**

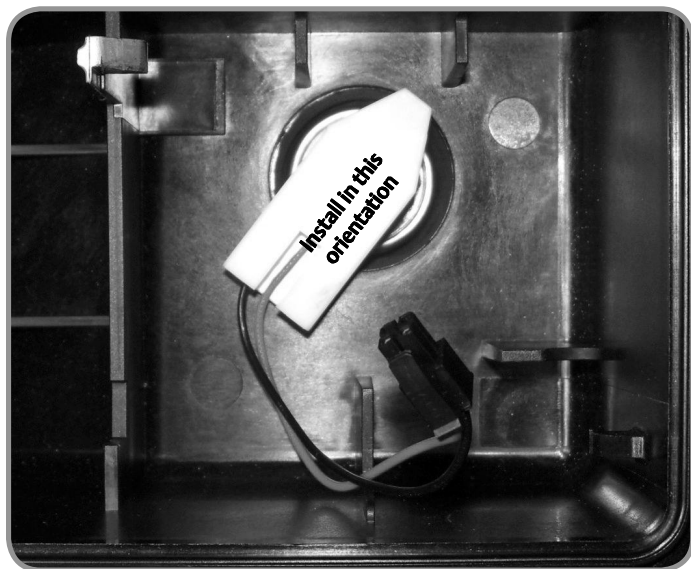
Removing the Kriwan INT69 SC2® Module

1. Disconnect and lock-out the high voltage and control voltage supply to the unit.
2. Using a straight blade screwdriver, carefully depress the tabs holding the terminal cover to the terminal box to remove the terminal cover. Before proceeding, use a volt meter to verify that the power has been disconnected from the unit.
3. Using wire markers, label the M1, M2, T1, and T2 wires that are connected to the Kriwan module. Using needle nose pliers, remove the M1, M2, T1, T2, S1 and S2 wires from the Kriwan motor protector module.
4. Using your fingers to gently bend the tabs holding the Kriwan module in the terminal box, remove the Kriwan module from the terminal box (see picture below).
5. Take note of the S1-S2 plug orientation on the compressor thermistor fusite. Remove the S1-S2 wire harness and plug from the compressor.

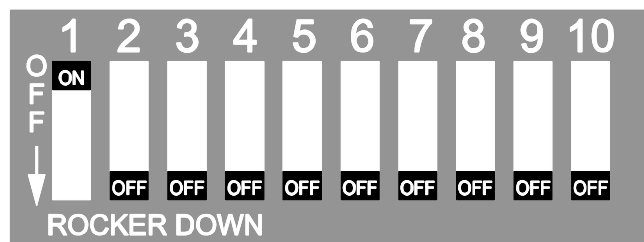


Installing the CoreSense™ Communications Module

1. A new S1-S2 thermistor wiring harness is shipped with the CoreSense kit and must be used. The wiring harness connector block should be fully inserted on the three pins in the orientation shown in the picture below for proper operation.



2. Review the dip switch settings on the CoreSense module. Dip switch #1 should be “on” (up position) and all other dip switches should be “off” (down position) for standalone (non-communicating) operation. Please refer to the dip switch diagram below.



3. Install the CoreSense module in the compressor terminal box as shown below, with the tabs holding the module in place. Route the thermistor wire harness as shown and plug the harness into the 2x2 socket on the CoreSense module.

4. Connect the previously labeled M1, M2, T1, and T2 wires to the appropriate terminals on the CoreSense module.
5. Connect the L1, L2, and L3 phase sensing wire to the L1, L2, and L3 compressor terminal block connections. See the compressor terminal cover diagram for identification of the L1, L2, and L3 terminal block connections.
6. Double check the installation and make sure all connections are secure. Install the compressor terminal cover.
7. The CoreSense retrofit is complete and the system can be put back into service.



EmersonClimate.com

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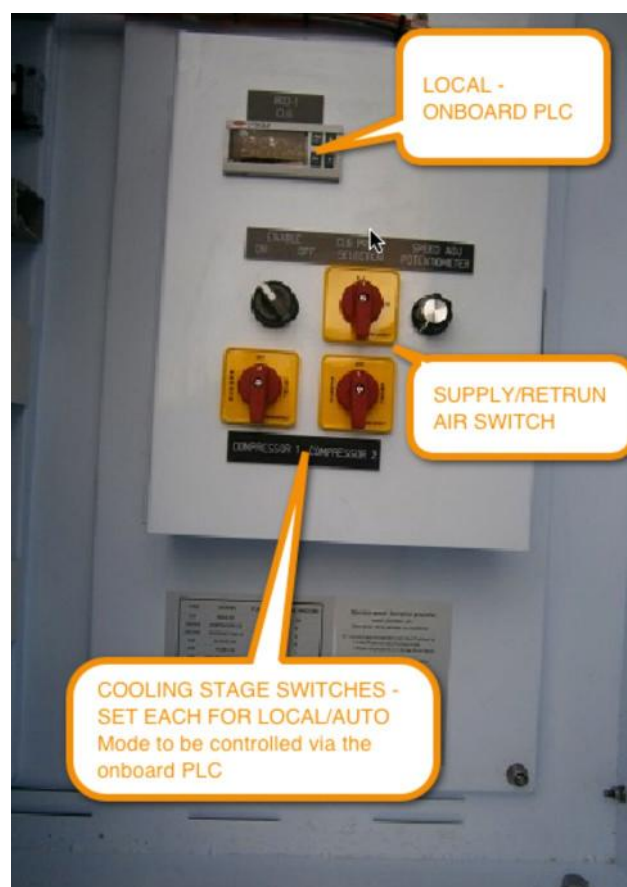
Thursday, November 19, 2015

Attn: All model SACP & SMT rental customers, Smartech representatives and Authorized Service agents.

RE: PLC SET-POINT CHANGE ON ALL SACP rentalized packaged air conditioning units

All Smartech brand, model SACP rental units (Including models SACP20Q, SACP27Q, SACP40Q, SACP60Q, SACP65Q, SACP80Q, SACP40A-HS, and SACP80A-HS) are equipped with a PLC controller. Units are capable of operating each stage of cooling in MANUAL (HAND) mode, REMOTE (remote T-STAT mode) of LOCAL (AUTO – ONBOARD PLC controlled mode). This bulletin also covers SMT035Q – SMT150Q products.

In order to change the set-point (either return air or supply air), verify that the unit has been set-up to run in LOCAL/AUTO mode (each cooling stage switch to be set to run in LOCAL/AUTO). Adjust the SA/RA switch so that the unit is controlled via SUPPLY AIR (SA) or RETURN AIR (RA). Standard set-points are 70F for RETURN AIR (which is ST 1) and 55F for SUPPLY AIR (ST 2).



To change either the supply air or return air set-point:

If you want to change ST1 (return air): HOLD the SET key for 5 SECONDS. ST 1 (Return air) set point should now be seen on the PLC. Press the UP and DOWN keys to change the set-point to the desired range. Press the SET key again for the PLC to accept the change. Press the SET key a final time to return the display to normal viewing mode.

If you want to change ST 2 (Supply air): HOLD the SET key for 5 SECONDS. ST 1 (Return air) set point should now be seen on the PLC. Press SET 1 time and the PLC should now read ST 2. Press the UP and DOWN keys to change the set-point to the desired range. Press the SET key again for the PLC to accept the change. Press the SET key a final time to return the display to normal viewing mode.

* Once you have made wait 60 seconds. The micro controller will need 60 seconds to reset.

Only change the set-point to within the SFCP factory approved range. Damage to the equipment can result from operating outside the approved range (for cooling: 50F leaving air temp and 65F return air temp min.)