INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

LCS Products Supplement to HRSN2 through HRSN6 Series Low Voltage and Single Phase Products

TO PREVENT POTENTIAL INJURY OR DAMAGE TO PROPERTY, READ THIS MANUAL CAREFULLY AND COMPLETELY.

IMPORTANT SAFETY INSTRUCTIONS

Basic safety precautions should always be followed, including the following: Failure to follow instructions can cause severe injury and/or death.

⚠ This is the safety-alert symbol. When you see this symbol on your equipment or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

⚠ WARNING warns about hazards that could cause serious personal injury, death or major property damage and if ignored presents a potential hazard.

⚠ CAUTION warns about hazards that will or can cause minor or moderate personal injury and/or property damage and if ignored presents a potential hazard. It can also make consumers aware of actions that are unpredictable and unsafe.

Notice: A notice indicates special instructions that are important but not related to hazards.

⚠ WARNING - Read and follow all instructions in this IOM manual and on the equipment. Failure to follow instructions can cause severe injury and/or death.

⚠ WARNING – Risk of Electric Shock. All electrical wiring MUST be in conformance with applicable local codes, regulations, and the National Electric Code (NEC). Hazardous voltage can shock, burn, and cause death or serious property damage. To reduce the risk of electric shock, do NOT use an extension cord to connect unit to electric supply. Provide a properly located electrical receptacle. Before working on any electrical equipment, turn off power supply to the equipment.

⚠ WARNING – To reduce the risk of electric shock replace damaged wiring immediately.

⚠ WARNING – Ground all electrical equipment before connecting to electrical power supply. Failure to ground all electrical equipment can cause serious or fatal electrical shock hazard.

⚠ WARNING – Do NOT ground to a gas supply line.

⚠ WARNING – To avoid dangerous or fatal electrical shock, turn OFF power to all electrical equipment before working on electrical connections.

⚠ WARNING – Failure to bond all electrical equipment to system structure will increase risk for electrocution and could result in injury or death. To reduce the risk of electric shock, see installation instructions and consult a professional electrician on how to bond all electrical equipment. Also, contact a licensed electrician for information on local electrical codes for bonding requirements.

⚠ CAUTION – Potential pinch point. Equipment connected to or driven by this device may start unexpectedly and may cause personal injury or entrapment in linkage systems.

TABLE OF CONTENTS

Notice: HRCK, HRCB, HRCL & HRCD Series actuators are fully assembled, calibrated and tested prior to leaving our factory. In most cases, after you have mounted the actuator to your device, you should be able to operate the actuator from fully CW to fully CCW and back again, and find that no adjustments are needed. The assembly can be put into service immediately.

If, however, it should be necessary to make adjustments to the end-of-travel positions to overcome any device related issues (i.e. valve shaft incorrectly timed to the drive stem), the procedures outlined in the Installation, Operation and Maintenance Instructions (IOM) for each unit should be followed to put the assembly into service. Note that there is a maximum adjustment range of +/- 3° at each end of travel.

⚠ **CAUTION –** For any 3 Phase products (i.e. HRCK4AR8E1EACTM), refer to the IOM for the respective 3 Phase unit. These instructions are specific to low voltage and single phase products only.

LCS SUPPLEMENT TO HRS SERIES ACTUATORS

Local Control Stations (LCS) provide a means to select Local or Remote control of a valve or damper actuator. There are four different types of LCS offered on the HRS series actuators. Each of these four types provide unique capabilities and human-machine interface.

This supplemental Guide is to be utilized in conjunction with the actuator IOM. This document differs from the actuator IOM.

This guide will provide necessary wiring diagrams which will differ from those provided in the actuator IOM itself. You MUST utilize the wiring diagrams provided in this supplement.

Dimensional Data will differ from that provided in the actuator IOM.

Type CK

Type CK – Key/Knob type. This is an IP65 type round enclosure that is integral to the actuator housing. It employs a key switch for the Mode select, a knob switch for Move commands, and three LED indicators indicating Power, Open and Closed positions. This version is available on HRCK2 thru HRCK6 actuators.

Type CB

Type CB – Knob/Knob type. This is an IP67 type round enclosure that is integral to the actuator housing. This model utilizes knob switches to select Remote/Local Mode and Open/Stop/Close Mode, and LED indicators to show Power, Fully Open, and Fully Closed positions. This version is available on HRCB3 thru HRCB6 actuators.

Type CL

Type CL – LED type. This is an IP67 rectangular enclosure integral with the actuator housing. This model has non-intrusive magnetic type knob switches for Mode and Position control. This version also employs an LED panel mounted behind glass with indicators for Open, Close, Remote, Local and Fault. This version is available on HRCL3 thru HRCL6 actuators.

Type CD

Type CD – LCD type. This is an IP67 rectangular enclosure integral with the actuator housing. This model has non-intrusive magnetic type knob switches for Mode and Position control. This version utilizes a monochrome (blue) LCD panel that provides graphic information regarding the status of the actuator. Its main feature is a large % display in the center of the screen which shows the position of the actuator as a function of % of full OPEN. The numeric display flashes when the actuator is moving. There are UP and DN arrows showing direction of travel.

The lower line of text in the display shows mode of operation, normal status, fault status, and torque switch trips in their respective directions. There are also LED indicators above the screen that show Local, Remote, Open and Closed functions. This version is available on HRCD3 thru HRCD6 actuators.

CONVENTIONS USED IN THIS MANUAL

Below are Terms and Definitions used throughout this manual.

1. **XTS/TS** product manufactured without/with Torque Switches.
2. **LCS** product manufactured with attached Local Control Station.
3. **CW** is Clockwise and **CCW** is Counterclockwise.

Depending on the options required you can efficiently select the type of LCS unit and wiring diagram you require.

ACTUATOR OPTIONS

Control	Voltage	Actuator Range*	Torque Switches**	Local Control	Wiring Diagram Page
On/Off	24VDC/VAC	HRCK2A~4D	XTS/TS	LCS CK	6
On/Off	120/230VAC	HRCK2A~6A	XTS/TS	LCS CK	6
On/Off	24VDC/VAC	HRCB3A~4D	XTS/TS	LCS CB	6
On/Off	120/230VAC	HRCB3A~6A	XTS/TS	LCS CB	6
Proportional	24VDC/VAC	HRCK2A~4D	XTS/TS	LCS CK	7
Proportional	120/230VAC	HRCK2A~6A	XTS/TS	LCS CK	7
Proportional	24VDC/VAC	HRCB3A~4D	XTS/TS	LCS CB	7
Proportional	120/230VAC	HRCB3A~6A	XTS/TS	LCS CB	7
On/Off	24VDC/VAC	HRCL3A~4D	XTS/TS	LCS CL	8
On/Off	120/230VAC	HRCL3A~6A	XTS/TS	LCS CL	8
On/Off	24VDC/VAC	HRCD3A~4D	XTS/TS	LCS CD	8
On/Off	120/230VAC	HRCD3A~6A	XTS/TS	LCS CD	8
Proportional	24VDC/VAC	HRCL3A~4D	XTS/TS	LCS CL	9
Proportional	120/230VAC	HRCL3A~6A	XTS/TS	LCS CL	9
Proportional	24VDC/VAC	HRCD3A~4D	XTS/TS	LCS CD	9
Proportional	120/230VAC	HRCD3A~6A	XTS/TS	LCS CD	9

* The only LCS available in the HRSN2A~2S range is the LCS CK.
** Some frame sizes are available only with TS (no XTS option).

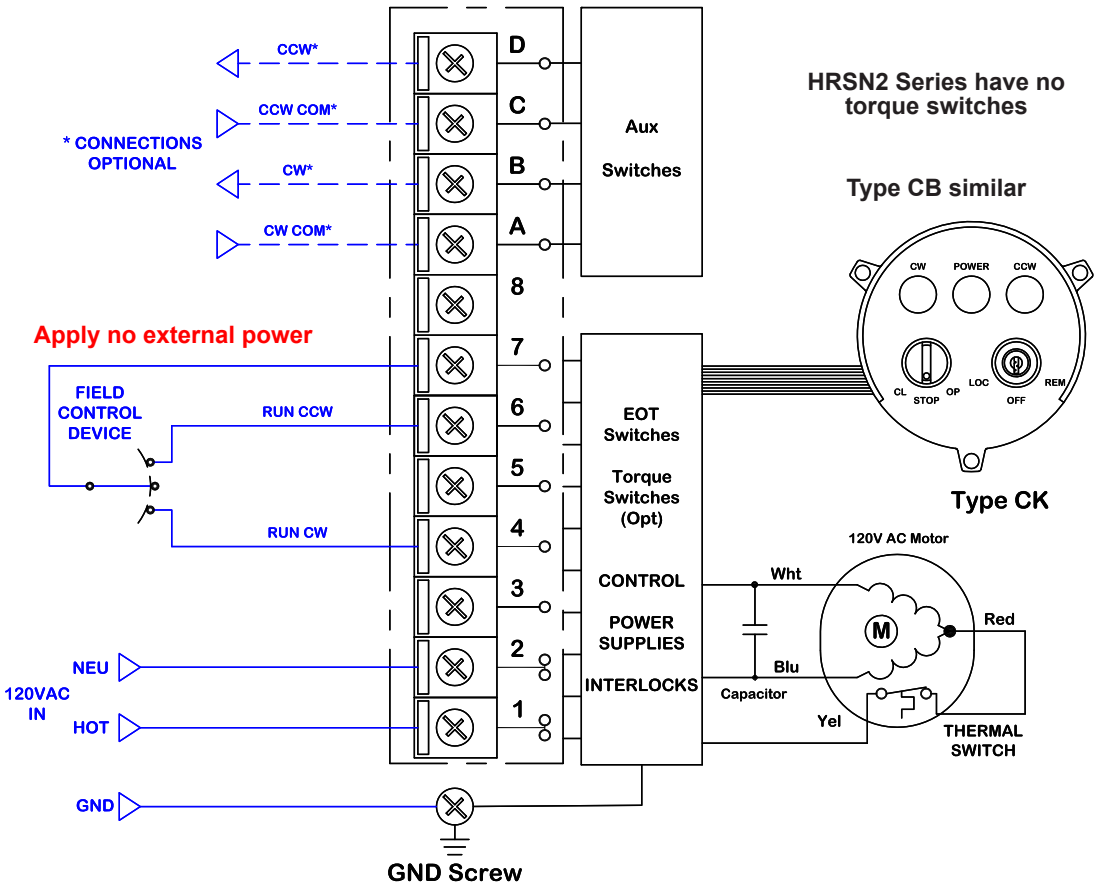
THEORY OF OPERATION

HRCK and HRCB advanced stand-alone actuators are designed to be installed in new construction sites or existing sites where there are NO existing local control capabilities. These single phase and low voltage actuators have several versions that continue to add more features and options than the standard actuator range.

Moreover, these units incorporate a Local Control Station (LCS) to facilitate operating the actuator. Having this feature allows operation of the actuator WITHOUT having an existing PLC or BAS based analog controller while also providing operability with existing external controls.

Inside the actuator/LCS package, you will find:

1. **Integral Local Control Device.** This series is designed to operate in Local mode (control knobs or buttons located on the face of the LCS, which is an integral part of the actuator) or in Remote mode, which utilizes commands from a PLC, BAS or other volt-free contact (dry contact) automation device.
   A. While in **Remote mode**, the Remote devices must have volt-free contacts (dry contacts) which will switch the actuator's internal power supply to generate commands to drive CW or CCW.
   B. While in **Local mode**, the actuator responds to the position of the controls located on the face of the integral LCS.
   C. On CK Series actuators only, the Mode switch is operated by a removable key which, when removed, will prevent unauthorized changes in the operating mode (Local, Off or Remote).



THEORY OF OPERATION

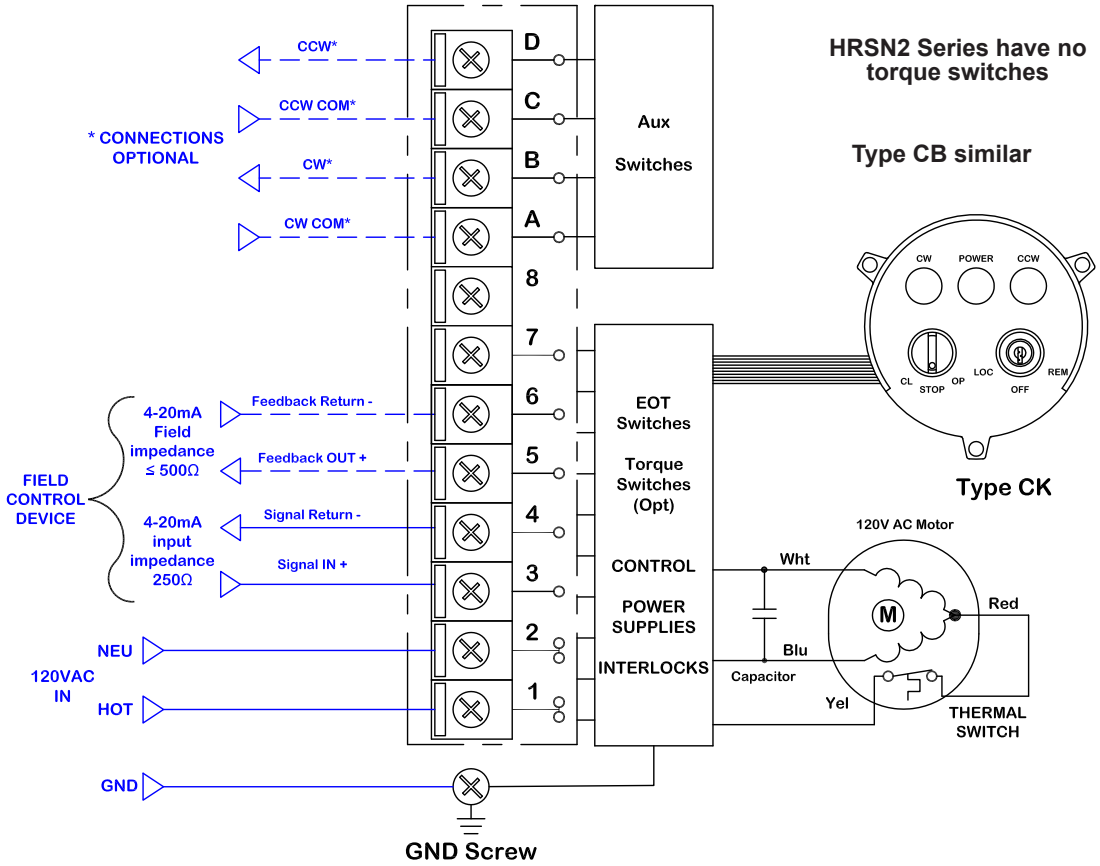
HRCK and HRCB advanced stand-alone actuators are designed to be installed in new construction sites or existing sites where there are NO existing local control capabilities. These single phase and low voltage actuators have several versions that continue to add more features and options than the standard actuator range.

These units accept analog control signals (4-20mA or 2-10VDC) and process these incoming signals to position the actuator as a function of the incoming signal. Additionally, these units generate an analog feedback signal proportional to the position of the actuator and not directly related to the incoming signal. This feedback signal is designed to be used by automation devices or displays external to the actuator.

Moreover, these units incorporate a Local Control Station (LCS) to facilitate operating the actuator locally. Having this feature allows operation of the actuator WITHOUT having an existing PLC or BAS based analog controller while also providing operability with existing external controls.

Inside the actuator/LCS package, you will find:

1. **Integral Local Control Device**. This series is designed to operate in Local mode (control knobs located on the face of the LCS which is an integral part of the actuator) or in Remote mode, which utilizes commands from a PLC, BAS or other volt-free contact (dry contact) automation device.
   A. While in **Local mode**, the actuator responds to the position of the controls located on the face of the integral LCS.
   B. On CK Series actuators only, the Mode switch is operated by a removable key which, when removed, will prevent unauthorized changes in the operating mode (Local, Off or Remote).
2. **Proportional Controller**. When the unit is in **Remote Mode**, this analog processing Printed Circuit Board (PCB) accepts 4-20mA or 2-10VDC from the field and positions the actuator accordingly, utilizing the internal reversing motor control. A 4-20mA or 2-10VDC feedback signal is internally generated to provide remote reading of the position of the actuator.



THEORY OF OPERATION

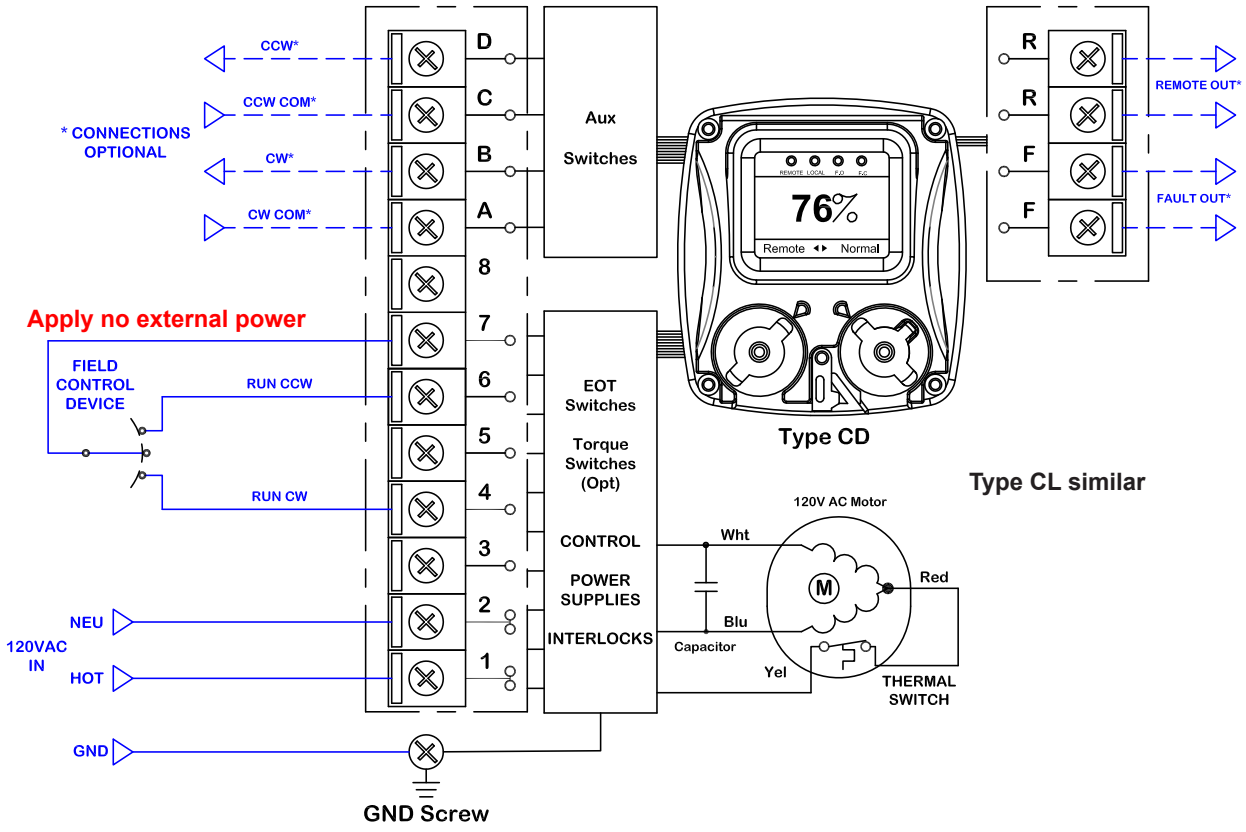
HRCL and HRCD advanced stand-alone actuators are designed to be installed in new construction sites or existing sites where there are NO existing local control capabilities. These single phase and low voltage proportional control actuators have several versions that continue to add more features and options than the standard actuator range.

These actuators generate a 24V control output that is connected to a remote PLC or BAS to control the actuator. This 24V output also serves as a status of the power connections and actuator operability. Any internal faults will disable the 24V control output. Moreover, these units incorporate a Local Control Station (LCS) to facilitate operating the actuator locally. Having this feature allows operation of the actuator WITHOUT having an existing PLC or BAS based analog controller while also providing operability with existing external controls.

Inside the actuator/LCS package, you will find:

1. **Integral Local Control Device.** This series is designed to operate in Local mode (control knobs located on the face of the LCS which is an integral part of the actuator) or in Remote mode, which utilizes commands from a PLC, BAS or other volt-free contact (dry contact) automation device.

   A. While in **Remote mode**, the Remote devices must have volt-free contacts (dry contacts) which will switch the actuator's **internal** power supply to generate commands to drive CW (0°) or CCW (90°).
   B. While in **Local mode**, the actuator responds to the position of the controls located on the face of the integral LCS.
   C. The Mode switch employs a padlockable lever that locks the Mode switch in any of its three positions, preventing unauthorized changes in the operating mode (Local, Off or Remote).



THEORY OF OPERATION

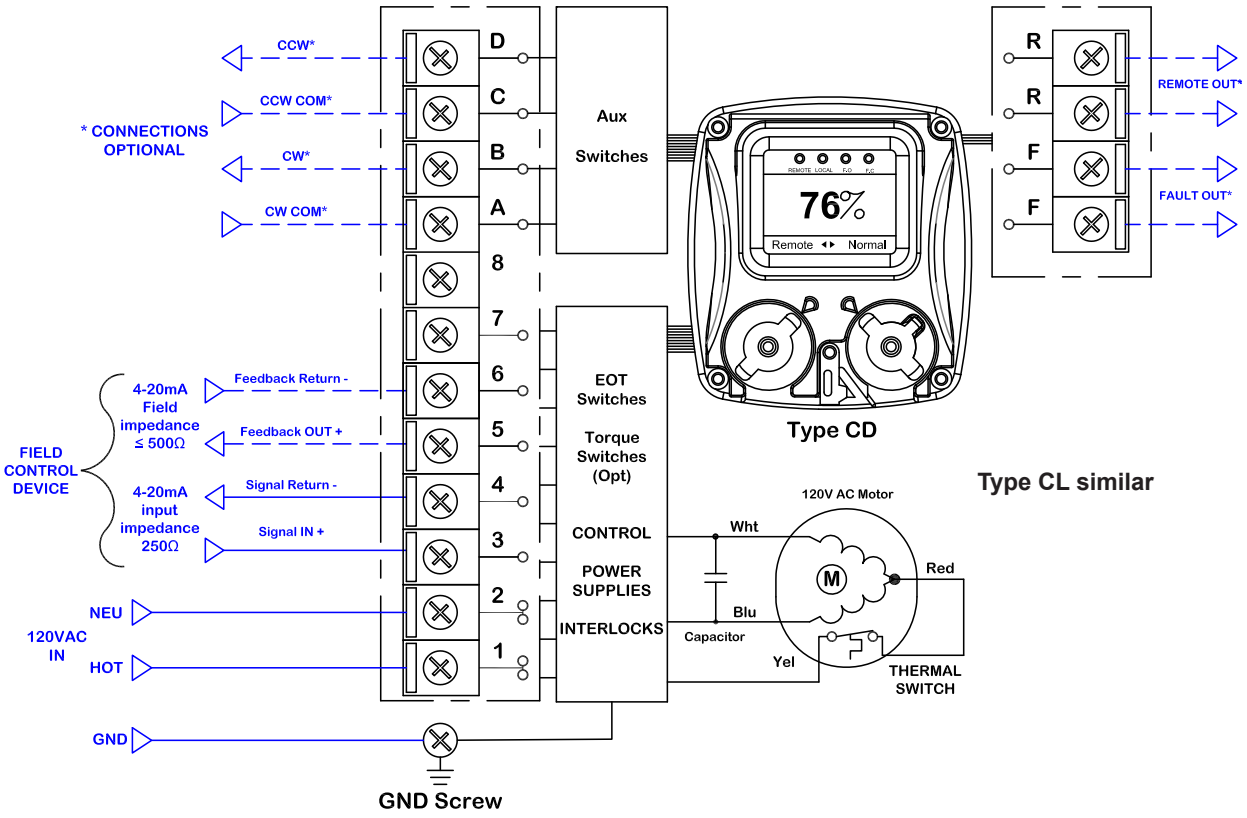
HRCL and HRCD advanced stand-alone actuators are designed to be installed in new construction sites or existing sites where there are NO existing local control capabilities. These single phase and low voltage proportional control actuators have several versions that continue to add more features and options than the standard actuator range.

These units accept analog control signals (4-20mA or 2-10VDC) and process these incoming signals to position the actuator as a function of the incoming signal. Additionally, these units generate an analog feedback signal proportional to the position of the actuator and not directly related to the incoming signal. This feedback signal is designed to be used by automation devices or displays external to the actuator.

Moreover, these units incorporate a Local Control Station (LCS) to facilitate operating the actuator locally. Having this feature allows operation of the actuator WITHOUT having an existing PLC or BAS based analog controller while also providing operability with existing external controls.

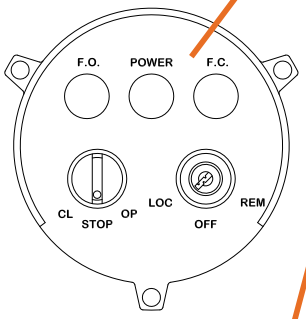
Inside the actuator/LCS package, you will find:

1. **Integral Local Control Device.** This series is designed to operate in Local mode (control knobs located on the face of the LCS which is an integral part of the actuator) or in Remote mode, which utilizes commands from a PLC, BAS or other volt-free contact (dry contact) automation device.
   A. While in **Local mode**, the actuator responds to the position of the controls located on the face of the integral LCS.
   B. The Mode switch employs a padlockable lever that locks the Mode switch in any of its three positions, preventing unauthorized changes in the operating mode (Local, Off or Remote).
2. **Proportional Controller**. When the unit is in **Remote Mode**, this analog processing Printed Circuit Board (PCB) accepts 4-20mA or 2-10VDC from the field and positions the actuator accordingly, utilizing the internal reversing motor control. A 4-20mA or 2-10VDC feedback signal is internally generated to provide remote reading of the position of the actuator.

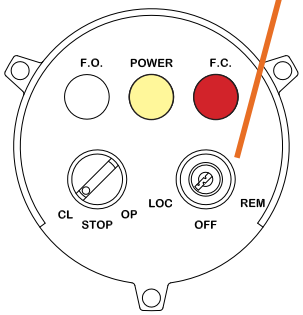


CK SERIES LCS OPERATION

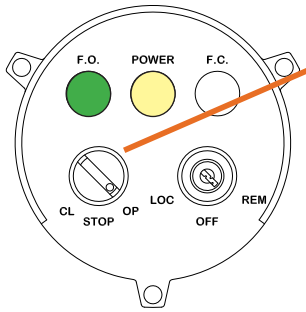
Operating the Local Control Station



Panel Indicators



Panel shown in the LOC Mode, actuator is fully CW



Panel shown in the REM Mode, actuator is fully CCW

This round NEMA 4X & IP65 enclosure houses two rotary control knobs that provide the user with the ability to operate the actuator in a normal (REMOTE) mode where the actuator responds to control signals from a building automation or a PLC or other control device (by others). Or the user can elect to operate the actuator in LOCAL mode where one can control the positioning of the actuator while standing AT the device. This allows opening and closing the actuator (valve) to test for operation, perform maintenance or other function without relying on radio communication to command the automation system to position the actuator.

A Key is provided for lockout and secured access to the MODE control switch of the actuator. With the key removed (from any of the three positions), the MODE switch cannot be changed.

The Position Indicators (top).

POWER (POWER indicator, all actuators): The Power LED is illuminated whenever power is present at the unit, regardless of MODE position.

The panel also contains two colored LED indicators to provide visual indication of the position and status of the actuator. The F.O. LED corresponds to the CCW actuator position. The F.C. LED corresponds to the CW actuator position. Both remain steady ON when their respective end of travel is reached.

The MODE switch (right hand side) has three positions.

- **REM** (REMOTE, On/Off actuators): sets the actuator to respond to field generated control signals. In this mode the POSITION knob has NO affect on the positioning of the actuator. All actuator movement is controlled by the external signal device. The manual handwheel may be used to reposition the actuator while in this mode; however, if an active external signal is present, the actuator WILL reposition as a function of that control signal. The indicators are active in this mode.
- **REM** (REMOTE, Proportional Control actuators): The actuator follows the incoming 4-20mA (2-10VDC) control signal, and generates a 4-20mA (2-10VDC) feedback signal OUT respective of the position of the actuator.
- **LOC** (LOCAL, On/Off actuators): sets the actuator to respond to the POSITION knob. The indicators are active in this mode.
- **LOC** (LOCAL, Proportional Control actuators): The actuator responds to the function of the POSITION knob.
- **OFF** (all models) In the OFF position, electronic movement of the actuator is disabled. The actuator will NOT respond to any incoming remote or local signals. The actuator MAY be operated manually using the handwheel and the unit will STAY in its desired position.

⚠ ***WARNING – Being in the OFF mode does NOT serve as a power disconnect to the actuator. Live voltage will still be present inside the actuator.***

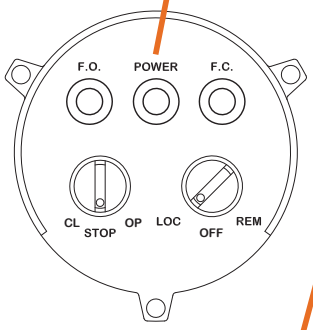
The POSITION switch (left hand side) has three positions.

When power is present in the unit, the mode switch is operational.

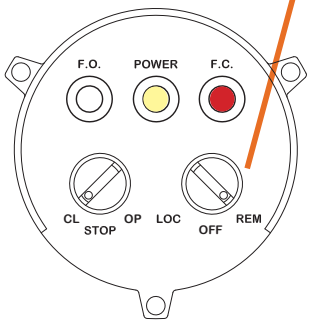
- **STOP** (STOP, On/Off actuators) removes any ability to reposition the actuator electrically.
- **STOP** (STOP, Proportional Control actuators): The actuator generates a 4-20mA (2-10vdc) feedback signal OUT respective of the position of the actuator.
- **OP** (CCW) set the POSITION switch to OP to drive the actuator to the full CCW position.
- **CL** (CW) set the POSITION switch to CL to drive the actuator to the full CW position.
- The position switch can be used to “bump” or “jog” the actuator incrementally in either direction as well.

CB SERIES LCS OPERATION

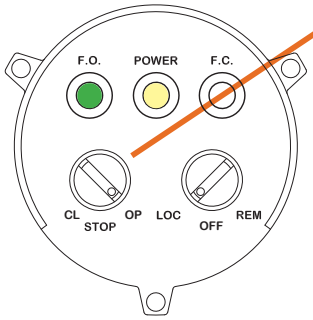
Operating the Local Control Station



Panel shown with NO POWER



Panel shown in the REM Mode, actuator is fully CW



Panel shown in the LOC Mode, actuator is fully CCW

This round NEMA 4X & IP67 enclosure houses two rotary control knobs that provide the user with the ability to operate the actuator in a normal (REMOTE) mode where the actuator responds to control signals from a building automation system or a PLC or other control device (by others). Or the user can elect to operate the actuator in LOCAL mode where one can control the positioning of the actuator while standing AT the device. This allows opening and closing the actuator (valve) to test for operation, perform maintenance or other function without relying on radio communication to command the automation system to position the actuator.

The POSITION switch and MODE switch are three position switches.

The Position Indicators (top).

POWER (POWER indicator, all actuators): The Power LED is illuminated whenever power is present at the unit, regardless of MODE position.

The panel also contains two colored LED indicators to provide visual indication of the position and status of the actuator. The F.O. LED corresponds to the CCW actuator position. The F.C. LED corresponds to the CW actuator position. Both remain steady ON when their respective end of travel is reached.

The MODE switch (right hand side) has three positions.

- **REM** (REMOTE, On/Off actuators): sets the actuator to respond to field generated control signals. In this mode the POSITION knob has NO affect on the positioning of the actuator. All actuator movement is controlled by the external signal device. The manual handwheel may be used to reposition the actuator while in this mode; however, if an active external signal is present, the actuator WILL reposition as a function of that control signal. The indicators are active in this mode.
- **REM** (REMOTE, Proportional Control actuators): The actuator follows the incoming 4-20mA (2-10VDC) control signal, and generates a 4-20mA (2-10VDC) feedback signal OUT which corresponds to the position of the actuator.
- **LOC** (LOCAL, On/Off actuators): sets the actuator to respond to the POSITION knob. The indicators are active in this mode.
- **LOC** (LOCAL, Proportional Control actuators): The actuator responds to the function of the POSITION knob.
- **OFF** (all models) In the OFF position, electronic movement of the actuator is disabled. The actuator will NOT respond to any incoming remote or local signals. The actuator MAY be operated manually using the handwheel and the unit will STAY in its desired position.

WARNING – Being in the OFF mode does NOT serve as a power disconnect. Live voltage will still be present inside the actuator.

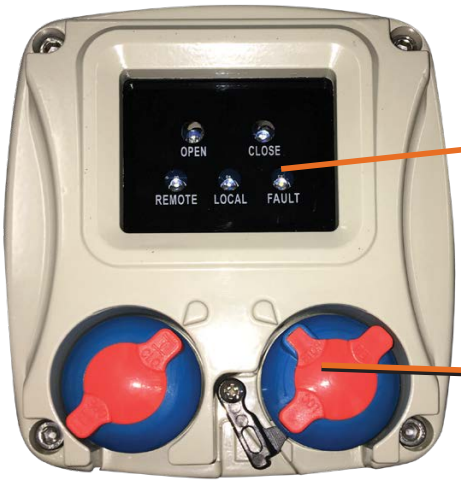
The POSITION switch (left hand side) has three positions.

When power is present in the unit, the mode switch is operational.

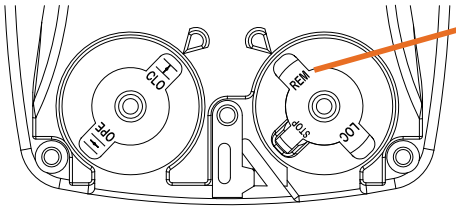
- **STOP** (STOP, On/Off actuators) removes any ability to reposition the actuator electrically.
- **STOP** (STOP, Proportional Control actuators): The actuator generates a 4-20mA (2-10VDC) feedback signal OUT which corresponds to the position of the actuator.
- **OP** (CCW) set the POSITION switch to OP to drive the actuator to the full CCW position.
- **CL** (CW) set the POSITION switch to CL to drive the actuator to the full CW position.
- The position switch can be used to “bump” or “jog” the actuator incrementally in either direction as well.

CL SERIES LCS OPERATION

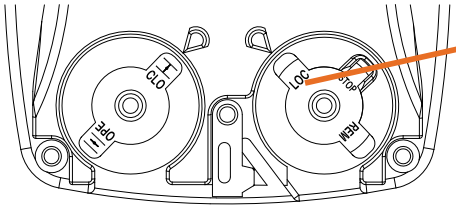
Operating the Local Control Station



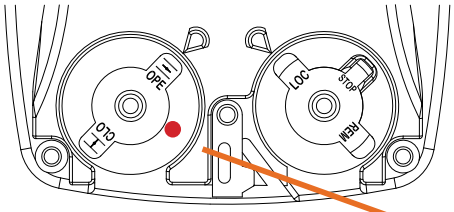
Panel shown in the STOP Mode



Panel shown in the REM Mode driving CW



Panel shown in the LOC Mode driving CW



Panel shown in the LOC Mode driving CCW

There is a padlockable lever that engages with the MODE knob to lock the operation of the MODE switch in position. It provides restricted access in any of the three positions.

This rectangular NEMA 4X & IP67 (Optional IP68) enclosure houses two non-intrusive (magnetic) rotary control knobs that provide the user with the ability to operate the actuator in a normal (REMOTE) mode where the actuator responds to control signals from a building automation or a PLC or other control device (by others). Or the user can elect to operate the actuator in LOCAL mode where one can control the positioning of the actuator while standing AT the device. This allows opening and closing the actuator (valve) to test for operation, perform maintenance or other function without relying on radio communication to command the automation system to position the actuator.

The panel also contains five bright LED's to provide visual indication of the position and status of the actuator. OPEN and CLOSE flash when the actuator is MOVING CCW or CW, and they remain steady ON when end of travel is reached. There are individual LEDs to show Remote, Local and Fault functions.

The MODE switch (right hand side) has three positions.

- **STOP** (STOP, On/Off actuators): STOP (center position) removes any ability to reposition the actuator electrically. Power is still present in the unit, and the OPEN and CLOSE LED indicators are operational. If the unit is fully CLOSED (CW), then the RED LED will be steady ON. Due to its epicyclic gear train, the manual handwheel CAN be used to position the actuator. The actuator will remain in position last determined by the use of the handwheel.
- **STOP** (STOP, Proportional Control actuators): The actuator generates a 4-20mA (2-10VDC) feedback signal OUT respective of the position of the actuator.
- **REM** (REMOTE, On/Off actuators): Sets the actuator to respond to field generated control signals. In this mode the POSITION knob (left side) has NO affect on the positioning of the actuator. All actuator movement is controlled by the external signal device. The manual handwheel may be used to reposition the actuator while in this mode; however, if an active external signal is present, the actuator WILL reposition as a function of that control signal. The LED indicators are active in this mode.
- **REM** (REMOTE, Proportional Control actuators): The actuator follows the incoming 4-20mA (2-10VDC) control signal, and generates a 4-20mA(2- 10vdc) feedback signal OUT respective of the position of the actuator.
- **LOC** (LOCAL, On/Off actuators): Sets the actuator to respond to the POSITION knob (see below).
  - The LED indicators are active in this mode.
  - All external field signals are ignored and have no affect on the positioning of the actuator.
- **LOC** (LOCAL, Proportional Control actuators): The actuator responds to the function of the POSITION knob (see below) AND generates a 4-20mA (2-10VDC) feedback signal OUT respective of the position of the actuator.

The POSITION switch (left hand side) has three positions.

When in the LOC mode, the actuator has been set to respond to the POSITION knob (left side).

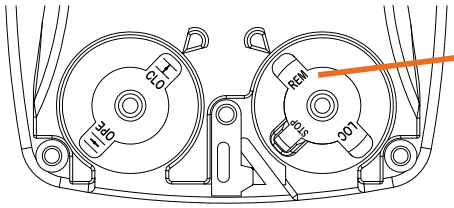
- **OPE** (OPEN, all models): When the POSITION knob is set to OPE, the actuator will drive to the full CCW position.
- **CLO** (CLOSE, all models): When the POSITION knob is set to CLO, the actuator will drive to the full CW position.
- There is an unmarked HOLD position detent in the knob (see red dot at left) that allows the actuator to maintain position at some point away from full travel endstops. In this mode, the manual handwheel may be used to reposition the actuator and it will remain in position while POSITION knob is in HOLD. The LED indicators are active in this mode. All external field signals are ignored and have no affect on the positioning of the actuator.

Back to TOC

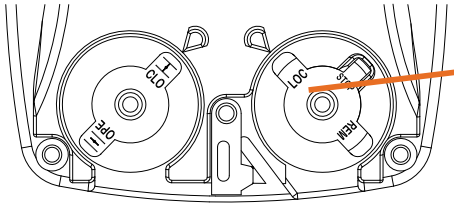
CD SERIES LCS OPERATION

Operating the Local Control Station

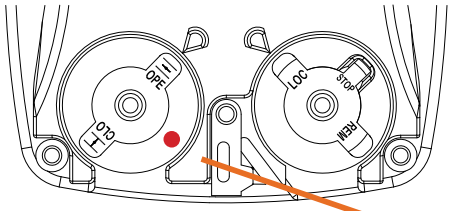
Panel shown in the LOC Mode



Panel shown in the REM Mode



Panel shown in the LOC Mode driving CW



Panel shown in the LOC Mode driving CCW

There is a padlockable lever that engages with the MODE knob to lock the operation of the MODE switch in position. It provides restricted access in any of the three positions.

This rectangular NEMA 4X & IP67 (Optional IP68) enclosure houses two nonintrusive (magnetic) rotary control knobs that provide the user with the ability to operate the actuator in a normal (REMOTE) mode where the actuator responds to control signals from a building automation or a PLC or other control device (by others). Or the user can elect to operate the actuator in LOCAL mode where one can control the positioning of the actuator while standing AT the device. This allows opening and closing the actuator (valve) to test for operation, perform maintenance or other function without relying on radio communication to command the automation system to position the actuator.

The panel houses a monochrome LCD screen that shows percentage of full CCW position as a default. There are individual LED's to show Remote and Local functions. The F.O. and F.C. LEDs flash when the actuator is MOVING CCW or CW, and they remain steady ON when the respective end of travel is reached. Any active faults are displayed in the LCD Screen area.

The MODE switch (right hand side) has three positions.

- **STOP** (STOP, On/Off actuators): STOP (center position) removes any ability to reposition the actuator electrically. Power is still present in the unit, and the OPEN and CLOSE LED indicators are operational. If the unit is fully CLOSED (CW), then the RED LED will be steady ON. Due to its epicyclic gear train, the manual handwheel CAN be used to position the actuator. The actuator will remain in position last determined by the use of the handwheel.
- **STOP** (STOP, Proportional Control actuators): The actuator generates a 4-20mA (2-10VDC) feedback signal OUT respective of the position of the actuator.
- **REM** (REMOTE, On/Off actuators): Sets the actuator to respond to field generated control signals. In this mode the POSITION knob (left side) has NO affect on the positioning of the actuator. All actuator movement is controlled by the external signal device. The manual handwheel may be used to reposition the actuator while in this mode; however, if an active external signal is present, the actuator WILL reposition as a function of that control signal. The LED indicators are active in this mode.
- **REM** (REMOTE, Proportional Control actuators): The actuator follows the incoming 4-20mA (2-10VDC) control signal, and generates a 4-20mA(2- 10vdc) feedback signal OUT respective of the position of the actuator.
- **LOC** (LOCAL, On/Off actuators): Sets the actuator to respond to the POSITION knob (see below).
  - The LED indicators are active in this mode.
  - All external field signals are ignored and have no affect on the positioning of the actuator.
- **LOC** (LOCAL, Proportional Control actuators): The actuator responds to the function of the POSITION knob (see below) AND generates a 4-20mA (2-10VDC) feedback signal OUT respective of the position of the actuator.

The POSITION switch (left hand side) has three positions.

When in the LOC mode, the actuator has been set to respond to the POSITION knob (left side).

- **OPE** (OPEN, all models): When the POSITION knob is set to OPE, the actuator will drive to the full CCW position.
- **CLO** (CLOSE, all models): When the POSITION knob is set to CLO, the actuator will drive to the full CW position.
- There is an unmarked HOLD position detent in the knob (see red dot at left) that allows the actuator to maintain position at some point away from full travel endstops. In this mode, the manual handwheel may be used to reposition the actuator and it will remain in position while POSITION knob is in HOLD. The LED indicators are active in this mode. All external field signals are ignored and have no affect on the positioning of the actuator.

Back to TOC

COMMISSIONING

Notice: The end stop travel (cams) of this actuator have been factory set and tested to respond between 0° and 90° degrees rotation. If NO changes to end stops are required, this unit is ready to be put into service immediately using this procedure. **IF changes to the cam positions are required, refer to the product IOM before proceeding.**

Conceptually this procedure first establishes correct direction and control; these MUST be verified in order to proceed. The actuator must drive CW when commanded to do so, and STOP when the actuator reaches the full CW travel position. The same applies for the CCW operation.

⚠ ***WARNING – Follow these directions for Commissioning rather than those of the product specific IOM. Please follow the steps carefully and in order. Actuator damage due to improper testing and commissioning will NOT be covered under warranty.***

⚠ **CAUTION –** This procedure has many sections with the text **"IMMEDIATELY remove power from the actuator to STOP movement"**. Quick action is necessary in case of any unexpected or uncontrolled movement to keep the actuator from possibly driving into the mechanical stops, past the limits of the valve or damper attached, and to simply keep the actuator in a known position for a quick, efficient installation.

Calibration Procedure - CK, CB Series On/Off Control

1. After the actuator and valve (damper) assembly have been installed with power and control connected, BEFORE applying power, **use the handwheel / manual override to rotate the actuator to a mid-travel position.** This procedure checks LOCAL mode first, then the integrity of REMOTE commands.
2. Note that NO external voltage is to be applied to terminals #3 through #7. To do so may damage the LCS unit.
3. Place the **LCS Mode switch in the OFF position**, and apply power.

   ⚠ ***WARNING – LETHAL voltages may be present inside this actuator.***

   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. Check control wiring (Reference the Actuator IOM). Correct if necessary, and repeat step 3.
   B. The white Power indicator on the face of the LCS should illuminate.
      I. Note that the **MODE** switch is NOT a power disconnect.
4. **Place the LCS Move switch in the STOP position**, and **place the Mode switch in LOCAL position**.
   A. The actuator should NOT move.
5. **Place the LCS Move switch in the CLOSE (0°)** position, and verify the DIRECTION of rotation of the position indicator is CW.
   A. Note: HRSN2-LCS units have no torque switches, proceed to step 5D.
   B. On HRCK/CB3A~4F units with torque switches, during CW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
   C. On HRCK/CB5A~6A units with torque switches, during CW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
   D. When the actuator reaches its full CW end of travel position, the F.C. indicator will light up on the face of the LCS.
6. **Place the LCS Move switch in the OPEN (90°)** position, and verify the DIRECTION of rotation of the position indicator is CCW.
   A. Note: HRSN2-LCS units have no torque switches, proceed to step 6D.

⚠ ***WARNING – Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop! Remove power from this device BEFORE making any travel adjustments.***

COMMISSIONING - CONTINUED

B. On HRCK/CB3A~4F units with torque switches, during CCW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
C. On HRCK/CB5A~6A units with torque switches, during CCW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
D. When the actuator reaches its full CCW end of travel position, the F.O. indicator will light up on the face of the LCS.

7. **Place the Move switch in the CLOSE (0°)** position and drive to approx mid-travel, then STOP.
8. Be sure there are NO REMOTE movement commands active, and **place the LCS Mode switch in the REMOTE position**.
   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. If it does NOT move, proceed to step 9.
      III. Check control wiring (Reference the Actuator IOM).
         a. Repeat step 8.
9. **Generate a remote CW move command** and verify the DIRECTION of the position indicator is CW.
   A. If it is NOT, immediately proceed to step 10.
   B. If it is, proceed to step 12.
10. Check Field wiring.
   A. Disconnect power.
      I. Remove field wiring to terminals 4, 6 & 7.
      II. Place a jumper between terminals 4 & 7. Do NOT apply external power to any of these terminals.
   B. Re-apply power. The actuator will move CW.
   C. After confirmation, remove the jumper and re-connect field wiring between terminal 4 & 7 ONLY and manually reposition the actuator back to mid-stroke.
11. **Generate a remote CW move command** and verify the DIRECTION of the position indicator is CW.
   A. If it is NOT, there is a problem with the field logic or wiring, troubleshoot accordingly.
   B. If it is, reconnect field wiring to terminal 6 and proceed to step 12.
12. **Generate a remote CCW move command** and verify the DIRECTION of the position indicator is CCW.
   A. If it is NOT, immediately proceed to step 13.
   B. If it is, proceed to step 15.
13. Check Field wiring.
   A. Disconnect power.
      I. Remove the field wiring on terminal 6.
      II. Place a jumper between terminals 6 & 7. Do NOT apply external power to any of these terminals.
   B. Re-apply power. The actuator will move CCW.
   C. After confirmation, remove the jumper and re-connect field wiring to terminal 6.
14. **Generate a remote CCW move command** and confirm the DIRECTION of the position indicator is CCW.
   A. If it is NOT, there is a problem with the field logic or wiring, troubleshoot accordingly.
   B. If it is, proceed to step 15.
15. **If the actuator does NOT stop at the correct positions**, fails to move in the correct directions, or on fails to stop movement when the respective torque switch levers are depressed, **IMMEDIATELY STOP the operation of the actuator** and refer to the base actuator IOM for the corrective action needed.
16. **Place the LCS in Local or Remote Mode to put the actuator into service.**

COMMISSIONING

Notice: The end stop travel (cams) of this actuator have been factory set and tested to respond between 0° and 90° degrees rotation. If NO changes to end stops are required, this unit is ready to be put into service immediately using this procedure. **IF changes to the cam positions are required, refer to the product IOM before proceeding.**

Conceptually this procedure first establishes correct direction and control; these MUST be verified in order to proceed. The actuator must drive CW when commanded to do so, and STOP when the actuator reaches the full CW travel position. The same applies for the CCW operation.

⚠ ***WARNING – Follow these directions for Commissioning rather than those of the product specific IOM. Please follow the steps carefully and in order. Actuator damage due to improper testing and commissioning will NOT be covered under warranty.***

⚠ **CAUTION –** This procedure has many sections with the text **"IMMEDIATELY remove power from the actuator to STOP movement"**. Quick action is necessary in case of any unexpected or uncontrolled movement to keep the actuator from possibly driving into the mechanical stops, past the limits of the valve or damper attached, and to simply keep the actuator in a known position for a quick, efficient installation.

Calibration Procedure - CK, CB Series Proportional Control

1. After the actuator and valve (damper) assembly have been installed with power and control connected, BEFORE applying power, **use the handwheel to rotate the actuator to a mid-travel position.** This procedure checks LOCAL mode first, then the integrity of REMOTE commands.
2. Note that ONLY CONTROL SIGNALS are to be applied to terminals #3 through #6. To do otherwise will damage the proportional control processor.
3. **Place the LCS Mode switch in the OFF position**, and apply power.
   A. The white Power indicator should illuminate on the face of the LCS.
   B. Note that the **MODE** switch is NOT a power disconnect and lethal voltages may be present even in the OFF position.
   C. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. If it does NOT move, proceed to step 4.
      III. Check control wiring (Reference the Actuator IOM). Correct if necessary, and repeat step 3.

⚠ ***WARNING – LETHAL voltages may be present inside this actuator.***

4. **Place the LCS Move switch in the STOP position**, and **place the Mode switch in LOCAL position**.
   A. The actuator should NOT move.
5. **Place the LCS Move switch in the CLOSE (0°)** position and verify the DIRECTION of the position indicator is CW.
   A. Note: HRSN2-LCS units have no torque switches, proceed to step 5D.
   B. On HRCK/CB3A~4F units with torque switches, during CW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
   C. On HRCK/CB5A~6A units with torque switches, during CW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
   D. When the actuator reaches its full CW end of travel position, the F.C. indicator will light up on the face of the LCS.
6. **Place the LCS Move switch in the OPEN (90°)** position and verify the DIRECTION of the position indicator is CCW.

⚠ ***WARNING – Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop! Remove power from this device BEFORE making any travel adjustments.***

COMMISSIONING - CONTINUED

A. Note: HRSN2-LCS units have no torque switches, proceed to step 6D.
B. On HRCK/CB3A~4F units with torque switches, during CCW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
C. On HRCK/CB5A~6A units with torque switches, during CCW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
D. When the actuator reaches its full CCW end of travel position, the F.O. indicator will light up on the face of the LCS.

7. **Place the Move switch in the CLOSE (0°)** position and drive to approx mid-travel, then STOP.
8. **Set the control signal selection switches, refer to the LCS CK, CB Calibration detail page (default is 4-20mA I/O).**
9. **Generate a mid-travel command** (12mA) then place the **LCS Mode switch in the REMOTE position.**
   A. The actuator should move only to match the incoming signal, if at all.
      I. If the actuator moves and continues to move away from midpoint, **IMMEDIATELY remove power from the actuator to STOP movement.**
         a. Manually positon the actuator back to a mid-travel position.
         b. Place a meter in series with terminal 3 (meter-) and the wire coming from the field controller (meter+), it MUST read (+)12mA - (with power ON).
         c. If it does NOT, check the polarity of the incoming analog signal to make sure it is (+)12mA.
            i. Repeat step 9.
      II. If the actuator moves momentarily and then STOPS at the mid stroke position, proceed to step 10.
      III. If the actuator does not move at all, rotate the handwheel slightly in either direction to offset the controller
         a. The actuator should move back to the midpoint position and then STOP.
         b. Proceed to step 10.
10. **Generate a CW move command** (4mA) and verify the DIRECTION of the position indicator is CW.
    A. The actuator should run CW and run until it reaches its CW end of travel position.
    B. While power is on, an analog feedback signal OUT provides an electronic position of the actuator... i.e. 4mA = full CW and 20mA = full CCW positions (reference terminals #5(+) and #6(-)).
11. **Generate a CCW move command** (20mA) and verify the DIRECTION of the position indicator is CCW.
    A. The actuator should run CCW and run until it reaches its CW end of travel position.
    B. While power is on, an analog feedback signal OUT provides an electronic position of the actuator... i.e. 4mA = full CW and 20mA = full CCW positions.
12. **If the actuator does NOT stop at the correct positions**, fails to move in the correct directions, or on fails to stop movement when the respective torque switch levers are depressed, **IMMEDIATELY STOP the operation of the actuator** and refer to the Table of Contents for the section to reference for the corrective action needed.
13. Check the full scale response of the analog signals into and out of the actuator by referring to the Proportional Calibration section of your base actuator IOM.
14. **Place the LCS in Local or Remote Mode to put the actuator into service.**

LCS CK, CB CALIBRATION

Calibration Procedure - HRSN2A~6A CK, CB Series - On/Off and Proportional Control

LCS CK and LCS CB actuators use the standard control systems as the base actuators. Please refer to the base IOM for your actuator to calibrate the on/off or analog response of the actuator.

COMMISSIONING

Notice: The end stop travel (cams) of this actuator have been factory set and tested to respond between 0° and 90° degrees rotation. If NO changes to end stops are required, this unit is ready to be put into service immediately using this procedure. **IF changes to the cam positions are required, refer to the product IOM before proceeding.**

Conceptually this procedure first establishes correct direction and control; these MUST be verified in order to proceed. The actuator must drive CW when commanded to do so, and STOP when the actuator reaches the full CW travel position. The same applies for the CCW operation.

⚠ ***WARNING – Follow these directions for Commissioning rather than those of the product specific IOM. Please follow the steps carefully and in order. Actuator damage due to improper testing and commissioning will NOT be covered under warranty.***

⚠ **CAUTION –** This procedure has many sections with the text **"IMMEDIATELY remove power from the actuator to STOP movement"**. Quick action is necessary in case of any unexpected or uncontrolled movement to keep the actuator from possibly driving into the mechanical stops, past the limits of the valve or damper attached, and to simply keep the actuator in a known position for a quick, efficient installation.

Commissioning - CL Series - On/Off Control

1. After the actuator and valve (damper) assembly have been installed with power and control connected, BEFORE applying power, **use the handwheel to rotate the actuator to a mid-travel position.** This procedure checks LOCAL mode first, then the integrity of REMOTE commands.
2. Note that NO external voltage is to be applied to terminals #3 through #7. To do so may damage the LCS unit.
3. Place the **LCS Mode switch in the STOP position,** and apply power.
   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. Check control wiring (Reference the Actuator IOM). Correct if necessary, and repeat step 3.

   ⚠ ***WARNING – LETHAL voltages may be present inside this actuator.***

   B. Note that the **MODE** switch is NOT a power disconnect and lethal voltages may be present even in the STOP position.
4. **Place the LCS Position switch in the STOP position**, and **place the Mode switch in LOC (Local) position**.
   A. The actuator should NOT move.
   B. The **LOCAL LED** will illuminate on the face of the LCS.
5. **Place the LCS Position switch in the CLO (0°)** position and verify the DIRECTION of the position indicator is CW.
   A. On HRCL3A~4F units with torque switches, during CW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
      I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
   B. On HRCL5A~6A units with torque switches, during CW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
      I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
   C. While traveling to the full CW (0°) position, the CLOSE LED will be flashing.
   D. When the actuator reaches its full CW (0°) end of travel position, the CLOSE LED indicator will illuminate constantly on the face of the LCS.
6. **Place the LCS Move switch in the OPE (90°)** position and verify the DIRECTION of the position indicator is CCW.

⚠ ***WARNING – Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop! Remove power from this device BEFORE making any travel adjustments.***

COMMISSIONING - CONTINUED

A. On HRCL3A~4F units with torque switches, during CCW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
   I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
B. On HRCL5A~6A units with torque switches, during CCW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
   I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
C. While traveling to the full CCW (90°) position, the OPEN LED will be flashing.
D. When the actuator reaches its full CCW (90°) end of travel position, the OPEN LED indicator will illuminate constantly on the face of the LCS.

7. **Place the Move switch in the CW (0°)** position and drive to approx mid-travel, then STOP.
8. Be sure there are NO REMOTE movement commands active, and **place the LCS Mode switch in the REMOTE position**.
   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. If it does NOT move, proceed to step 10.
      III. Check control wiring (Reference the Actuator IOM). Repeat step 7.
   B. The **REMOTE LED** will illuminate on the face of the LCS.
9. **Generate a REMOTE CW move command** and verify the DIRECTION of the position indicator is CW.
   A. If it is, proceed to step 11.
10. Check Field wiring.
   A. Disconnect power.
      I. Remove field wiring to terminals 4, 6 & 7.
      II. Place a jumper between terminals 4 & 7. Do NOT apply external power to any of these terminals.
   B. Re-apply power. The actuator will move CW.
   C. After confirmation, remove the jumper and re-connect field wiring between terminal 4 & 7 ONLY and manually reposition the actuator back to mid-stroke.
11. **Generate a REMOTE CW move command** and verify the DIRECTION of the position indicator is CW.
   A. If it is, reconnect field wiring to terminal 6 and proceed to step 11.
12. **Generate a REMOTE CCW move command** and verify the DIRECTION of the position indicator is CCW.
   A. If it is, proceed to step 14.
13. Check Field wiring.
   A. Disconnect power.
      I. Then remove field wiring to terminals 6 & 7.
      II. Place a jumper between terminals 6 & 7. Do NOT apply external power to any of these terminals.
   B. Re-apply power. The actuator will move CCW.
   C. After confirmation, remove the jumper and re-connect field wiring to terminals 6 & 7 and manually reposition the actuator back to mid-stroke.
14. **Generate a REMOTE CCW move command** and verify the DIRECTION of the position indicator is CCW.
15. **If the actuator does NOT stop at the correct positions**, fails to move in the correct directions, or on fails to stop movement when the respective torque switch levers are depressed, **IMMEDIATELY STOP the operation of the actuator** and refer to the Table of Contents for the section to reference for the corrective action needed.
16. Calibrate the actuator by referring to the section: LCS CL, CD Calibration.
17. **Place the LCS in Local or Remote Mode to put the actuator into service.**

COMMISSIONING

Notice: The end stop travel (cams) of this actuator have been factory set and tested to respond between 0° and 90° degrees rotation. If NO changes to end stops are required, this unit is ready to be put into service immediately using this procedure. **IF changes to the cam positions are required, refer to the product IOM before proceeding.**

Conceptually this procedure first establishes correct direction and control; these MUST be verified in order to proceed. The actuator must drive CW when commanded to do so, and STOP when the actuator reaches the full CW travel position. The same applies for the CCW operation.

⚠ ***WARNING – Follow these directions for Commissioning rather than those of the product specific IOM. Please follow the steps carefully and in order. Actuator damage due to improper testing and commissioning will NOT be covered under warranty.***

⚠ **CAUTION –** This procedure has many sections with the text **"IMMEDIATELY remove power from the actuator to STOP movement"**. Quick action is necessary in case of any unexpected or uncontrolled movement to keep the actuator from possibly driving into the mechanical stops, past the limits of the valve or damper attached, and to simply keep the actuator in a known position for a quick, efficient installation.

Commissioning - CL Series - Proportional Control

1. After the actuator and valve (damper) assembly have been installed with power and control connected, BEFORE applying power, **use the handwheel to rotate the actuator to a mid-travel position.** This procedure checks LOCAL mode first, then the integrity of REMOTE commands.
2. Note that ONLY CONTROL SIGNALS are to be applied to terminals #3 through #6. To do otherwise will damage the proportional control processor.
3. Place the **LCS Mode switch in the STOP position,** and apply power.
   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. Check control wiring (Reference the Actuator IOM). Correct if necessary, and repeat step 4.
   B. The blue backlit LCD screen on the face of the LCS will illuminate.

⚠ ***WARNING – LETHAL voltages may be present inside this actuator.***

4. Note that the **MODE** switch is NOT a power disconnect and lethal voltages may be present even in the STOP position.**Place the LCS Move switch in the STOP position**, and **place the Mode switch in LOCAL position**.
   A. The actuator should NOT move.
   B. The **LOCAL LED** will illuminate on the face of the LCS.
5. **Place the LCS Move switch in the CLO (0°)** position and verify the DIRECTION of the position indicator is CW.
   A. On HRCL3A~4F units with torque switches, during CW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
      I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
   B. On HRCL5A~6A units with torque switches, during CW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
      I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
   C. While traveling to the full CW (0°) position, the CLOSE LED will be flashing.
   D. When the actuator reaches its full CW (0°) end of travel position, the CLOSE LED indicator will illuminate constantly on the face of the LCS.

⚠ ***WARNING – Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop! Remove power from this device BEFORE making any travel adjustments.***

COMMISSIONING - CONTINUED

6. **Place the LCS Move switch in the OPE (90°)** position and verify the DIRECTION of the position indicator is CCW.
   A. On HRCL3A~4F units with torque switches, during CCW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
      I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
   B. On HRCL5A~6A units with torque switches, during CCW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
      I. When depressing the torque switch lever, the FAULT LED will illuminate on the face of the LCS.
   C. While traveling to the full CCW (90°) position, the OPEN LED will be flashing.
   D. When the actuator reaches its full CCW (90°) end of travel position, the OPEN LED indicator will illuminate constantly on the face of the LCS.
7. **Place the Move switch in the CLO (0°)** position and drive to approx mid-travel, then STOP.
8. **Set the control signal selection switches, refer to the LCS CL, CD Calibration (default is 4-20mA I/O).**
9. Be sure there are NO REMOTE movement commands active, and **place the LCS Mode switch in the REMOTE position**.
   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
   B. Check control wiring on terminals 3~7 on the actuator, correct if necessary and repeat step 9.
   C. The **REMOTE LED** will illuminate on the face of the LCS.
10. **Generate a REMOTE mid-travel command** (12mA) then place the **LCS Mode switch in the REMOTE position.**
   A. The actuator should move only to match the incoming signal.
      I. If the actuator moves and continues to move away from midpoint, **IMMEDIATELY remove power from the actuator to STOP movement.**
         a. Manually positon the actuator back to a mid-travel position.
         b. Place a meter in series with terminal 3 (meter-) and the wire coming from the field controller (meter+), it MUST read (+)12mA - (with power ON).
         c. If it does NOT, check the polarity of the incoming analog signal to make sure it is (+)12mA.
            i. Repeat step 10.
      II. If the actuator moves momentarily and then STOPS at the mid stroke position, proceed to step 9.
      III. If the actuator does not move at all, rotate the handwheel slightly in either direction to offset the controller
         a. The actuator should move back to the midpoint position and then STOP.
         b. Proceed to step 11.
11. **Generate a CW move command** (4mA) and verify the DIRECTION of the position indicator is CW.
   A. The actuator should run CW and run until it reaches its CW end of travel position.
   B. The CLOSE LED indicator on the front of the panel should illuminate.
   C. While power is on, an analog feedback signal OUT provides an electronic position of the actuator... i.e. 4mA = full CW and 20mA = full CCW positions (reference terminals #5 and #6).
12. **Generate a CCW move command** (20mA) and verify the DIRECTION of the position indicator is CCW.
   A. The actuator should run CCW and run until it reaches its CCW (90°) end of travel position.
   B. The OPEN LED indicator on the front of the panel should illuminate.
   C. While power is on, an analog feedback signal OUT provides an electronic position of the actuator... i.e. 4mA = full CW and 20mA = full CCW positions (reference terminals #5(+) and #6(-)).
13. **If the actuator does NOT stop at the correct positions**, fails to move in the correct directions, or on fails to stop movement when the respective torque switch levers are depressed, **IMMEDIATELY STOP the operation of the actuator** and refer to the Table of Contents for the section to reference for the corrective action needed.
14. Check the full scale response of the analog signals into and out of the actuator by referring to the section: LCS CL, CD Calibration.
15. **Place the LCS in Local or Remote Mode to put the actuator into service.**

COMMISSIONING

Notice: The end stop travel (cams) of this actuator have been factory set and tested to respond between 0° and 90° degrees rotation. If NO changes to end stops are required, this unit is ready to be put into service immediately using this procedure. IF changes to the cam positions are required, refer to the product IOM before proceeding.

Conceptually this procedure first establishes correct direction and control; these MUST be verified in order to proceed. Regardless of the Level of the actuator, the actuator must drive CW when commanded to do so, and STOP when the actuator reaches the full CW travel position. The same applies for the CCW operation.

⚠ ***WARNING – Follow these directions for Commissioning rather than those of the product specific IOM. Please follow the steps carefully and in order. Actuator damage due to improper testing and commissioning will NOT be covered under warranty.***

⚠ **CAUTION –** This procedure has many sections with the text **"IMMEDIATELY remove power from the actuator to STOP movement"**. Quick action is necessary in case of any unexpected or uncontrolled movement to keep the actuator from possibly driving into the mechanical stops, past the limits of the valve or damper attached, and to simply keep the actuator in a known position for a quick, efficient installation.

Commissioning CD Series On/Off Control

1. After the actuator and valve (damper) assembly have been installed with power and control connected, BEFORE applying power, **use the handwheel to rotate the actuator to a mid-travel position.** This procedure checks LOCAL mode first, then the integrity of REMOTE commands.
2. Note that NO external voltage is to be applied to terminals #3 through #7. To do so may damage the LCS unit.
3. Place the **LCS Mode switch in the STOP position,** and apply power.

   WARNING – LETHAL voltages may be present inside this actuator.

   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. Check control wiring (Reference the Actuator IOM). Correct if necessary, and repeat step 3.
   B. The blue backlit LCD screen on the face of the LCS will illuminate.
   C. Note that the **MODE** switch is NOT a power disconnect and lethal voltages may be present even in the STOP position.
4. **Place the LCS Position switch in the STOP position**, and **place the Mode switch in LOC (Local) position.**
   A. The actuator should NOT move.
   B. The bottom line of the LCD panel should display "LOCAL<>NORMAL".
   C. The LOCAL LED will be illuminated.
5. **Place the LCS Position switch in the CLO (0°)** position and verify the DIRECTION of the position indicator is CW.
   A. On HRCD3A~4F units with torque switches, during CW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
      • While the TS is depressed the bottom line of the LCD display will show "C-OTorq" until the TS is released.
   B. On HRCD5A~6A units with torque switches, during CW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
      • While the TS is depressed the bottom line of the LCD display will show "C-OTorq" until the TS is released.
   C. The actuator will run until it reaches its CW end of travel position. While running in the CW direction:
      • The LCD display will flash the percentage of full CCW in the center of the screen and the F.C. LED will be flashing.

⚠ ***WARNING – Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop! Remove power from this device BEFORE making any travel adjustments.***

COMMISSIONING - CONTINUED

- There will also be a small DOWN arrow just to the right of the % display, indicating movement in the CW direction.

D. Upon reaching end of travel, the F.C. LED will be on steady and the display will show a graphic of a CLOSED valve.

6. **Place the LCS Move switch in the OPE (90°)** position and verify the DIRECTION of the position indicator is CCW.
   A. On HRCD3A~4F units with torque switches, during CCW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
      - While the TS is depressed the bottom line of the LCD display will show “C-OTorq” until the TS is released.

   B. On HRCD5A~6A units with torque switches, during CCW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
      - While the TS is depressed the bottom line of the LCD display will show “C-OTorq” until the TS is released.

   C. The actuator will run until it reaches its CCW end of travel position. While running in the CCW direction:
      - The LCD display will flash the percentage of full CCW in the center of the screen and the F.O. LED will be flashing.
      - There will also be a small UP arrow just to the right of the % display, indicating movement in the CCW direction.

   D. Upon reaching end of travel, the F.O. LED will be on steady and the display will show a graphic of an OPEN valve.
7. Place the **MODE switch in the STOP** position, and use the handwheel to position the actuator at roughly mid-travel.
8. Be sure there are NO REMOTE movement commands active, and place the **LCS Mode switch in the REM (Remote) position.**
   A. The REMOTE LED will light up on the LED Panel.
   B. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. Check control wiring (Reference the Actuator IOM).
         a. Terminal #7 is 24V control voltage OUT of the actuator and feeds the Field control panel (i.e. PLC). With the MODE switch in REMOTE, measure the voltage between terminals #3 (Control Reference) & #7 (Control OUT) - must read 24v between those two terminals.
         b. Correct if necessary and repeat step 8.
9. **Generate a remote CW move command** and verify the DIRECTION of the position indicator is CW.
   A. If it is, proceed to step 10.
   B. If it is NOT, **IMMEDIATELY remove power from the actuator to STOP movement.**
      I. Check control wiring (Reference the Actuator IOM).
         a. Terminal #7 is 24V control voltage OUT of the actuator and feeds the Field control panel (i.e. PLC). With the MODE switch in REMOTE, and the POSITION switch in CLO, measure the voltage between terminals #3 (Control Reference) & #4 (CW) - must read 24v between those two terminals.
         b. Correct if necessary and repeat step 9.
10. **Generate a remote CCW move command** and verify the DIRECTION of the position indicator is CCW.
    A. If it is, proceed to step 11.
    B. If it is NOT, **IMMEDIATELY remove power from the actuator to STOP movement.**
       I. Check control wiring (Reference the Actuator IOM).
          a. Terminal #7 is 24V control voltage OUT of the actuator and feeds the Field control panel (i.e. PLC). With the MODE switch in REMOTE, and the POSITION switch in OPN, measure the voltage between terminals #3 (Control Reference) & #6 (CCW) - must read 24v between those two terminals.
          b. Correct if necessary and repeat step 10.
11. **If the actuator does NOT stop at the correct positions**, fails to move in the correct directions, or on torque switch units, fails to stop movement when the torque switch levers are depressed, **IMMEDIATELY STOP the operation of the actuator** and refer to the Table of Contents for the section to reference for the corrective action needed.
12. Calibrate the actuator by referring to the section: LCS CL, CD Calibration.
13. **Place the LCS in Local or Remote Mode to put the actuator into service.**

COMMISSIONING

Notice: The end stop travel (cams) of this actuator have been factory set and tested to respond between 0° and 90° degrees rotation. If NO changes to end stops are required, this unit is ready to be put into service immediately using this procedure. IF changes to the cam positions are required, refer to the product IOM before proceeding.

Conceptually this procedure first establishes correct direction and control; these MUST be verified in order to proceed. Regardless of the Level of the actuator, the actuator must drive CW when commanded to do so, and STOP when the actuator reaches the full CW travel position. The same applies for the CCW operation.

⚠ ***WARNING – Follow these directions for Commissioning rather than those of the product specific IOM. Please follow the steps carefully and in order. Actuator damage due to improper testing and commissioning will NOT be covered under warranty.***

⚠ **CAUTION –** This procedure has many sections with the text **"IMMEDIATELY remove power from the actuator to STOP movement"**. Quick action is necessary in case of any unexpected or uncontrolled movement to keep the actuator from possibly driving into the mechanical stops, past the limits of the valve or damper attached, and to simply keep the actuator in a known position for a quick, efficient installation.

Commissioning CD Series Proportional Control

1. After the actuator and valve (damper) assembly have been installed with power and control connected, BEFORE applying power, **use the handwheel to rotate the actuator to a mid-travel position.** This procedure checks LOCAL mode first, then the integrity of REMOTE commands.
2. Note that ONLY CONTROL SIGNALS are to be applied to terminals #3 through #6. To do otherwise will damage the proportional control processor.
3. Place the **LCS Mode switch in the STOP position,** and apply power.
   A. The actuator should NOT move.
      I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**
      II. Check control wiring (Reference the Actuator IOM). Correct if necessary, and repeat step 3.
   B. The blue backlit LCD screen on the face of the LCS will illuminate.
   C. Note that the **MODE** switch is NOT a power disconnect and lethal voltages may be present even in the STOP position.

⚠ ***WARNING – LETHAL voltages may be present inside this actuator.***

4. **Place the LCS Position switch in the STOP position**, and **place the Mode switch in LOC (Local) position.**
   A. The actuator should NOT move.
   B. The bottom line of the LCD panel should display "LOCAL<>NORMAL".
   C. The LOCAL LED will be illuminated.
5. **Generate a local CW move command** by placing the LCS Position switch in the CLO (CW) position and verify the DIRECTION of rotation of the position indicator is CW.
   A. The actuator will run until it reaches its CW end of travel position. While running in the CW direction:
      - The LCD display will flash the percentage of full CCW in the center of the screen and the F.C. LED will be flashing.
      - There will also be a small DOWN arrow just to the right of the % display, indicating movement in the CW direction.

⚠ ***WARNING – Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop! Remove power from this device BEFORE making any travel adjustments.***

COMMISSIONING - CONTINUED

B. On HRCD3A~4F units with torque switches, during CW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
   - While the TS is depressed the bottom line of the LCD display will show “C-OTorq” until the TS is released.

C. On HRCD5A~6A units with torque switches, during CW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
   - While the TS is depressed the bottom line of the LCD display will show “C-OTorq” until the TS is released.

D. Upon reaching end of travel, the F.C. LED will be on steady and the display will show a graphic of a CLOSED valve.

6. **Generate a local CCW move command** by placing the LCS Position switch in the OPN (CCW) position and verify the DIRECTION of rotation of the position indicator is CCW.
   A. The actuator will run until it reaches its CCW end of travel position. While running in the CCW direction:
      - The LCD display will flash the percentage of full CCW in the center of the screen and the F.O. LED will be flashing.
      - There will also be a small UP arrow just to the right of the % display, indicating movement in the CCW direction.

   B. On HRCD3A~4F units with torque switches, during CCW travel movement, depress the lever on the LOWER torque switch to interrupt actuator movement as a check of the system.
      - While the TS is depressed the bottom line of the LCD display will show “C-OTorq” until the TS is released.

   C. On HRCD5A~6A units with torque switches, during CCW travel movement, depress the lever on the UPPER torque switch to interrupt actuator movement as a check of the system.
      - While the TS is depressed the bottom line of the LCD display will show “C-OTorq” until the TS is released.

   D. Upon reaching end of travel, the F.O. LED will be on steady and the display will show a graphic of an OPEN valve.

7. **If the actuator does NOT stop at the correct positions,** fails to move in the correct directions, or on torque switch units, fails to stop movement when the torque switch levers are depressed, **IMMEDIATELY STOP the operation of the actuator** and refer to the Table of Contents for the section to reference for the corrective action needed.
8. **Place the Move switch in the CLO (0°)** position and drive to approx mid-travel, then STOP.
9. **Set the control signal selection switches, refer to the LCS CL, CD Calibration detail page (default is 4-20mA I/O).**
10. Be sure there are NO REMOTE movement commands active, and **place the LCS Mode switch in the REMOTE position**.
    A. The actuator should NOT move.
       I. If it does, **IMMEDIATELY remove power from the actuator to STOP movement.**

    B. Check control wiring on terminals 3~6 on the actuator, correct if necessary and repeat step 10.
    C. The **REMOTE LED** will illuminate on the face of the LCS.
11. **Generate a REMOTE mid-travel command** (12mA).
    A. The actuator should move only to match the incoming signal.
       I. If the actuator moves and continues to move away from midpoint, **IMMEDIATELY remove power from the actuator to STOP movement.**
          a. Manually positon the actuator back to a mid-travel position.
          b. Place a meter in series with terminal 3 (meter-) and the wire coming from the field controller (meter+), it MUST read (+)12mA.
             i. If it does NOT, check the polarity of the incoming analog signal to make sure it is (+)12mA.
             ii. Repeat step 11.

COMMISSIONING - CONTINUED

II. If the actuator moves momentarily and then STOPS at the mid stroke position, proceed to step 13.

III. If the actuator does not move at all, rotate the handwheel slightly in either direction to offset the controller
   a. The actuator should move back to the midpoint position and then STOP.
   b. Proceed to step 14.

12. **Generate a CW move command** (4mA) and verify the DIRECTION of the position indicator is CW.
   A. The actuator should run CW and run until it reaches its CW end of travel position.
   B. The F.C. LED indicator on the front of the panel should illuminate.
   C. While power is on, an analog feedback signal OUT provides an electronic position of the actuator... i.e. 4mA = full CW and 20mA = full CCW positions (reference terminals #5(+) and #6(-)).
   D. **Generate a CCW move command** (20mA) and verify the DIRECTION of the position indicator is CCW.
   E. The actuator should run CCW and run until it reaches its CCW (90°) end of travel position.
   F. The F.O. LED indicator on the front of the panel should illuminate.
   G. While power is on, an analog feedback signal OUT provides an electronic position of the actuator... i.e. 4mA = full CW and 20mA = full CCW positions (reference terminals #5(+) and #6(-)).
13. **If the actuator does NOT stop at the correct positions**, fails to move in the correct directions, or on fails to stop movement when the respective torque switch levers are depressed, **IMMEDIATELY STOP the operation of the actuator** and refer to the Table of Contents for the section to reference for the corrective action needed.
14. Check the full scale response of the analog signals into and out of the actuator by referring to the section: LCS CL, CD Calibration.
15. **Place the LCS in Local or Remote Mode to put the actuator into service.**

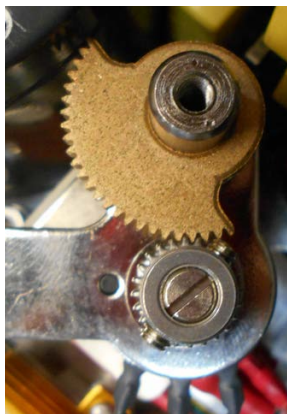
LCS CL, CD CALIBRATION

⚠ ***WARNING – Follow these directions carefully and in order. Actuator damage due to improper calibration will NOT be covered under warranty.***

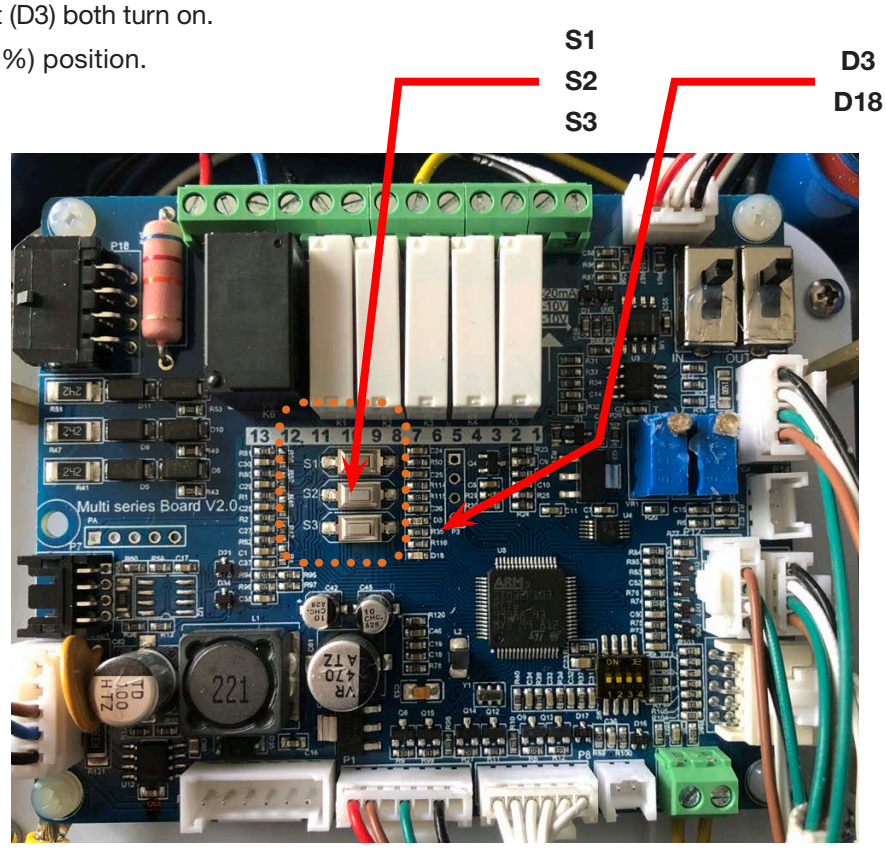
Calibration Procedure - HRSN3A~6A CL, CD Series - On/Off and Proportional Control

After completing all mounting and wiring procedures and the Commissioning has been performed, it is now possible to calibrate the analog response of the actuator.

1. Before applying power or making any wiring connections:
2. **Proportional Units Only:** Set the DIP switches for correct signal IN and feedback OUT and Response/Feedback (ref next page).
3. Position the actuator to a mid-stroke position.
4. Apply correct power according to the actuator model.
5. Press the S1 button on the control board for 5 seconds, the blue light (D18) turns on, the red light (D3) turns off. The control board then enters the Stroke Setting Mode.
6. Stroke Setting Mode: **set the desired CW end of travel position**.
   A. Note: Your desired CW end of travel MUST occur BEFORE the actuator end of travel switch trips.
   B. Press and hold the S3 button to move the actuator CW.
      - Note: If the end of travel switch trips, this procedure will stall. Drive the actuator slightly CCW to reset the end of travel switch and resume this process.
   C. When the actuator reaches the desired full CW end of travel, release the S3 button.
   D. Press the S1 button for 5 seconds.
      - The blue light (D18) and red light (D3) both turn on.
      - The MCU will record the CW (0%) position.
   E. The control board automatically enters the full CCW setting mode.
7. Stroke Setting Mode: **set the desired CCW end of travel position.**
   A. Note: Your desired CCW end of travel MUST occur BEFORE the actuator end of travel switch trips.
   B. Press and hold the S2 button to move the actuator CCW.
      - Note: If the end of travel switch trips, this procedure will stall. Drive the actuator slightly CW to reset the end of travel switch and resume this process.
   C. When the actuator reaches the desired full CCW end of travel, release the S2 button.
   D. Press S1 button for 5 seconds.
      - The blue light (D18) turns off and the red light (D3) turns on.
      - The MCU will record the CCW (100%) position.



Alignment of the sector and potentiometer gear sets at actuator full CW position. (reference only for Proportional Control units)



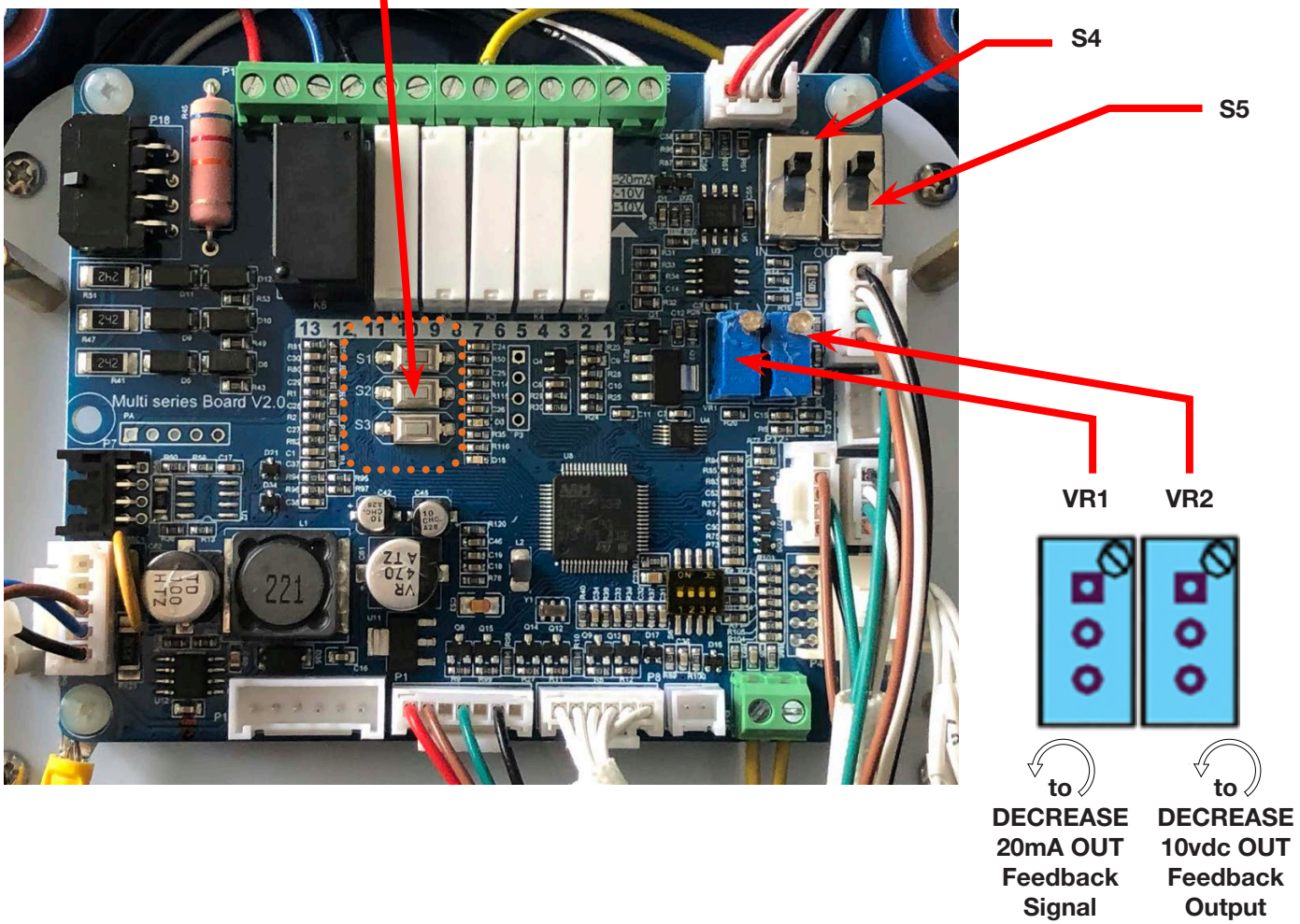
CALIBRATION - CONTINUED

Signal Switch Selections and VR1 and VR2 trimmers are for reference for analog control only.

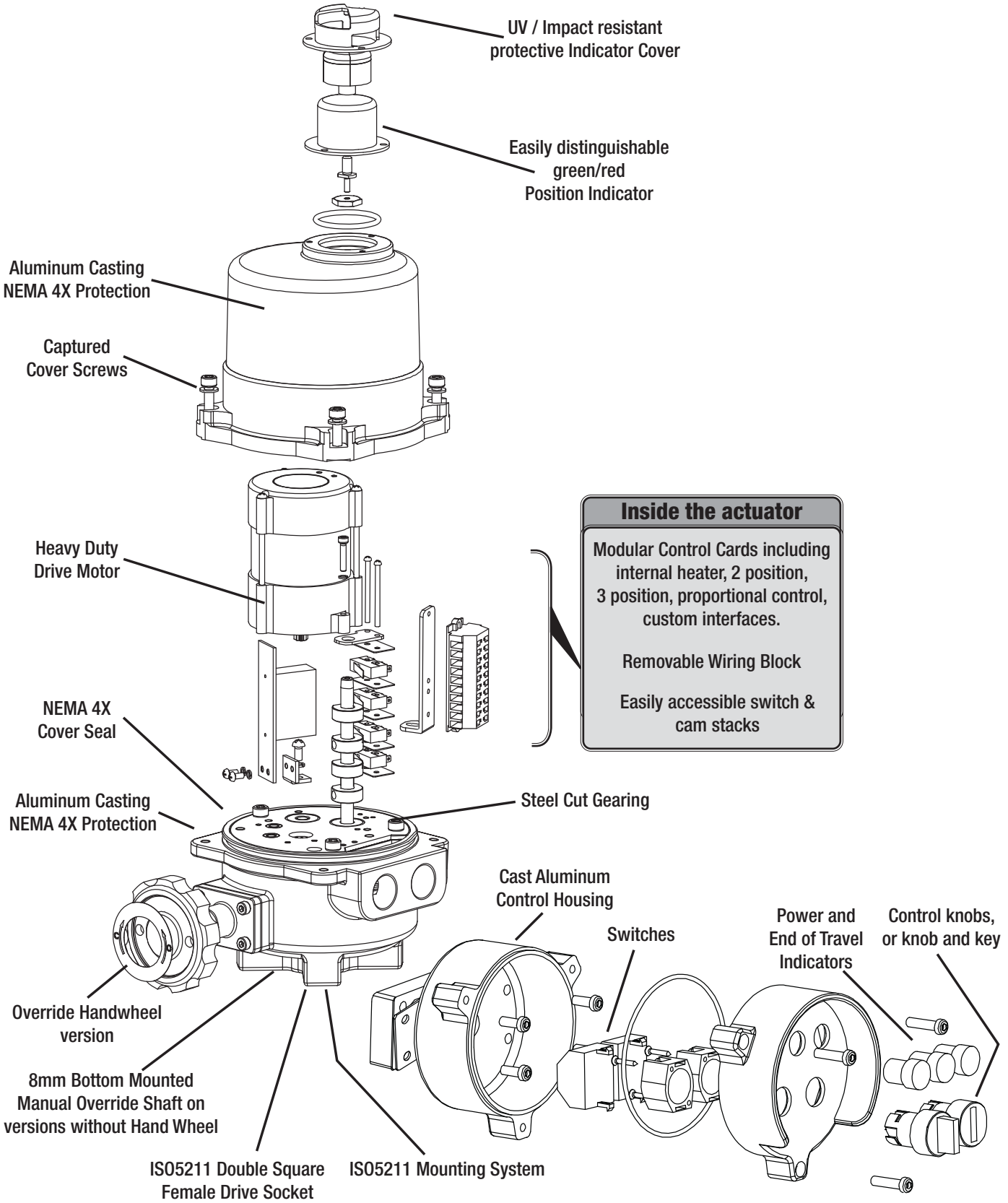
8. Stroke Setting is now complete, the control board automatically exits Stroke Setting Mode.
9. **Proportional Units Only:** Slight adjustments may be made to the 20mA trimmer (VR1) or 10vdc trimmer (VR2) to affect accuracy on the feedback signal as a function of actuator position (ref next page).
10. **Note:** The actuator has a protection function for a stalled drive. When the drive stalls for over 10 seconds, the system goes into lock mode and stops the stroke movement. If it happens during the Stroke Setting Mode, move the stroke towards the opposite direction to unlock. For example if it happens at CW (0%) position, direct the stroke towards CCW (100%) to release the stall protection function.
11. **Unit is now calibrated and is ready to be put into service. No other calibration is necessary.**

Signal Switch Selections DEFAULT

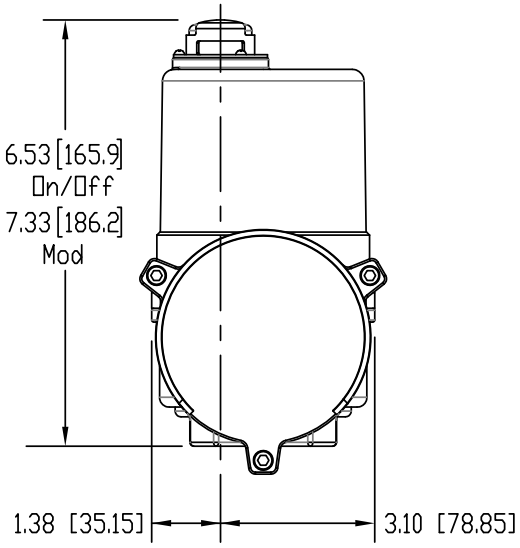
Signal Type		Input Signal S4	Output Signal S5
Current	4-20mA		
Voltage	2-10V		
	0-10V		

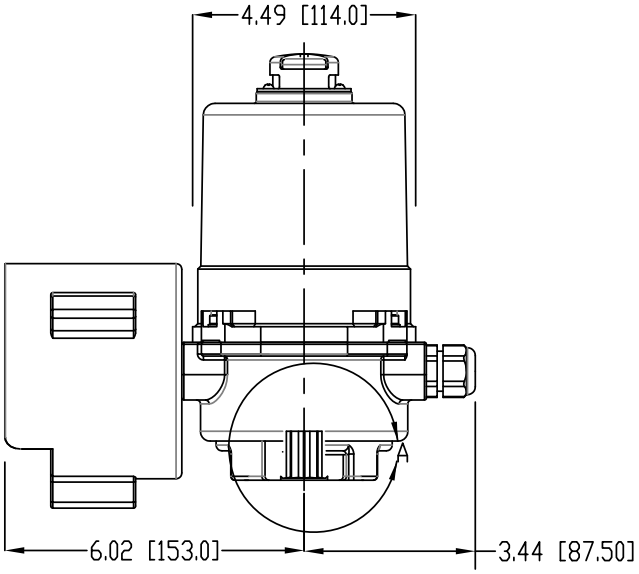


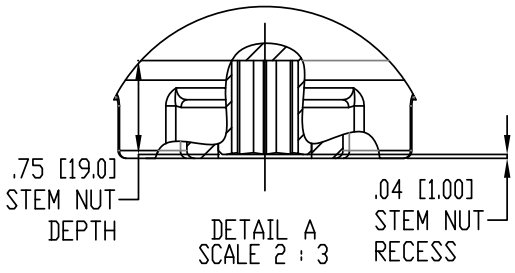
EXPLODED VIEW
HRCK, HRCB 2A~2S

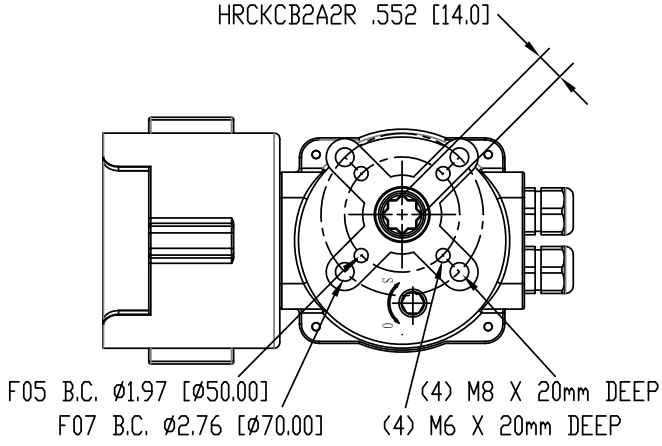


MECHANICAL DATA



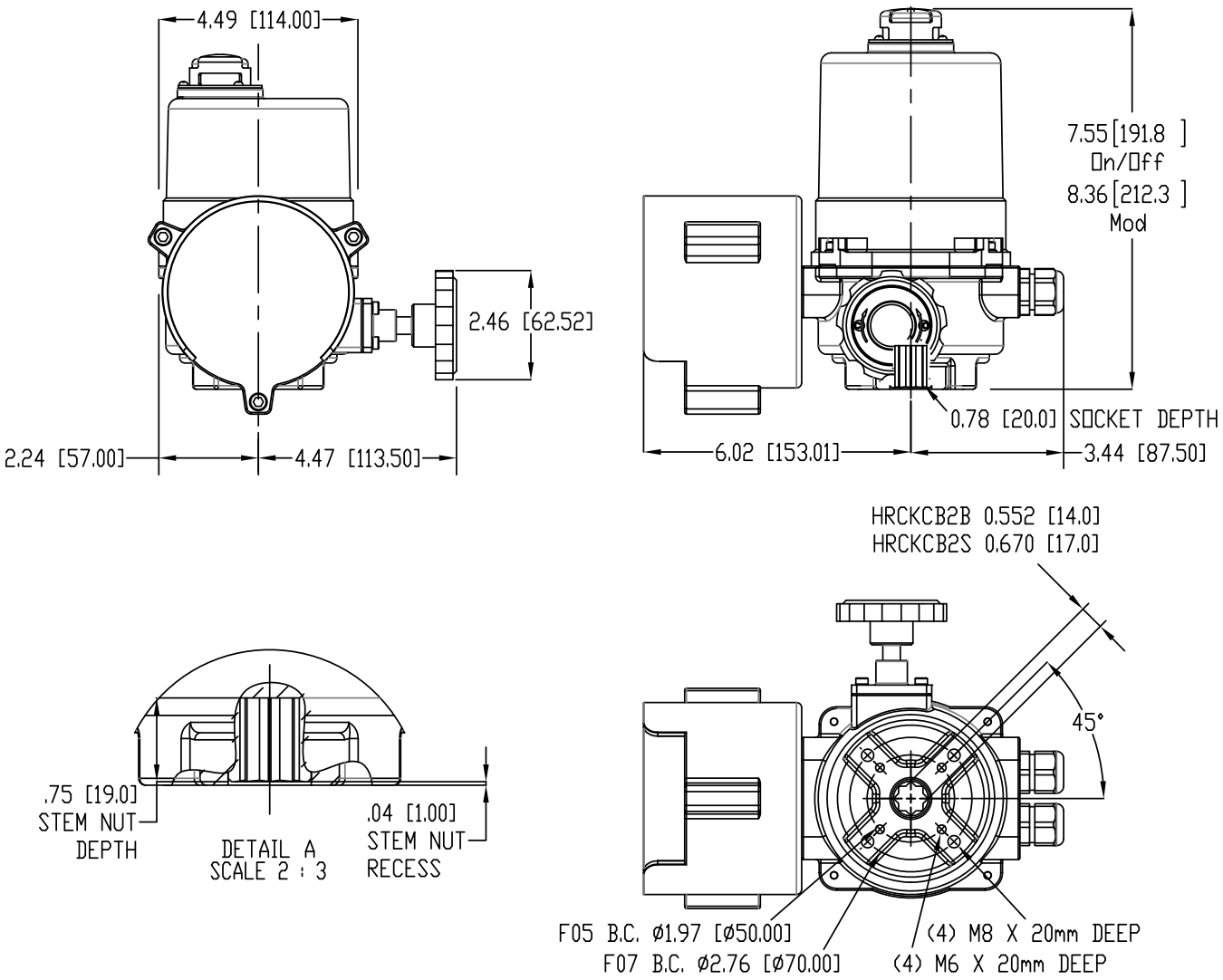






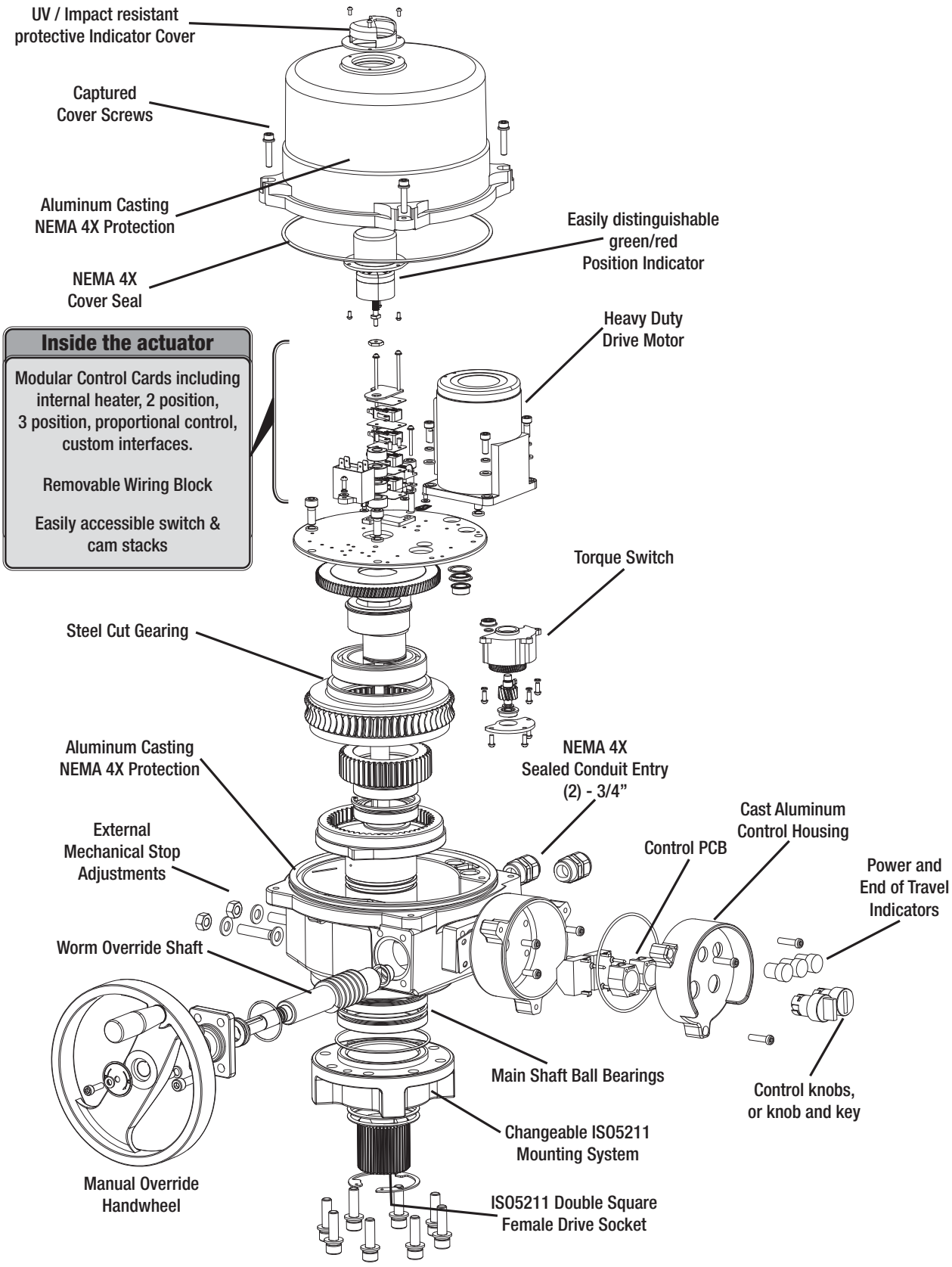
	COVER REMOVAL CLEARANCE		OVERRIDE		WEIGHT
MODEL	TYPE	IN/MM	MM	# TURNS FOR 90°	LBS/KG
HRCKCB2A	on/off - All	4.93 / 125	8mm hex	Approximately 5 turns 90°	13.2 / 6
	Mod - LV / HV				15.4 / 7
HRCKCB2R	on/off - All	4.93 / 125	8mm hex	Approximately 5 turns 90°	13.2 / 6
	Mod - LV / HV				15.4 / 7

MECHANICAL DATA

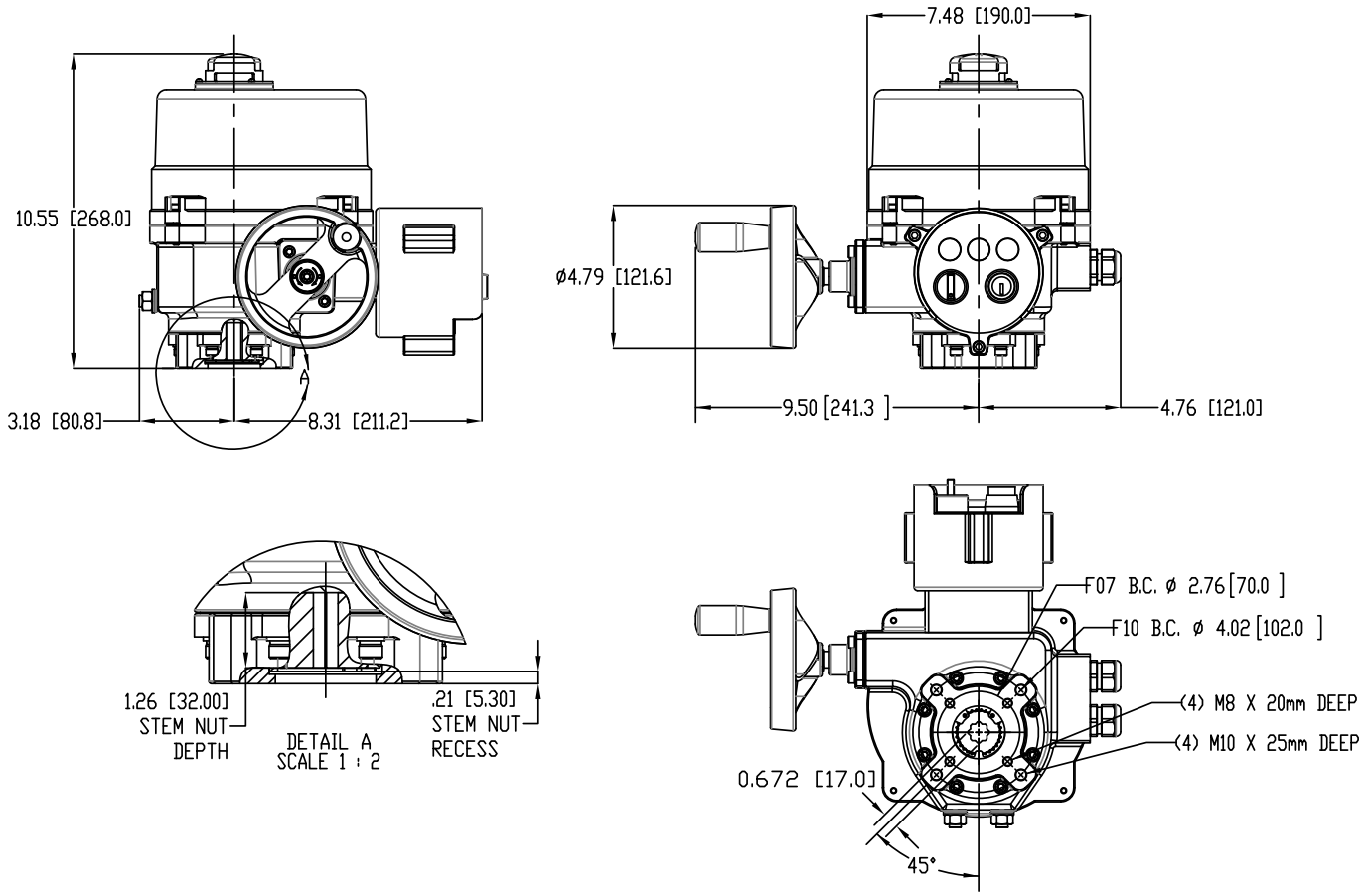


	COVER REMOVAL CLEARANCE		HANDWHEEL		WEIGHT
MODEL	TYPE	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCKCB2B	on/off - All	4.93 / 125	2.46 / 62.5	12 turns 90°	13.6 / 6.2
	Mod - LV / HV				15.8 / 7.2
HRCKCB2S	on/off - All	4.93 / 125	2.46 / 62.5	12 turns 90°	13.6 / 6.2
	Mod - HV				15.8 / 7.2

MECHANICAL DATA

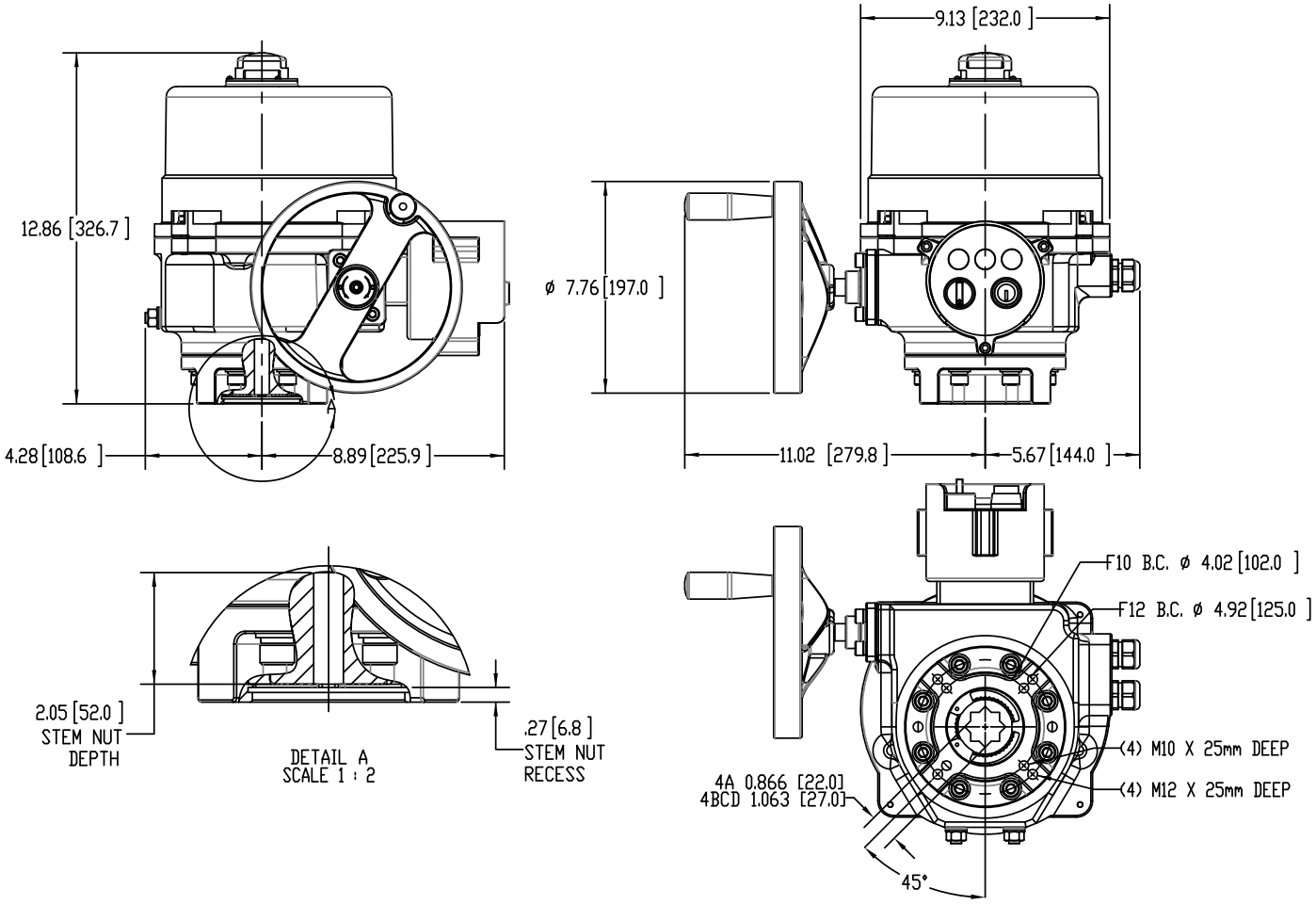


MECHANICAL DATA



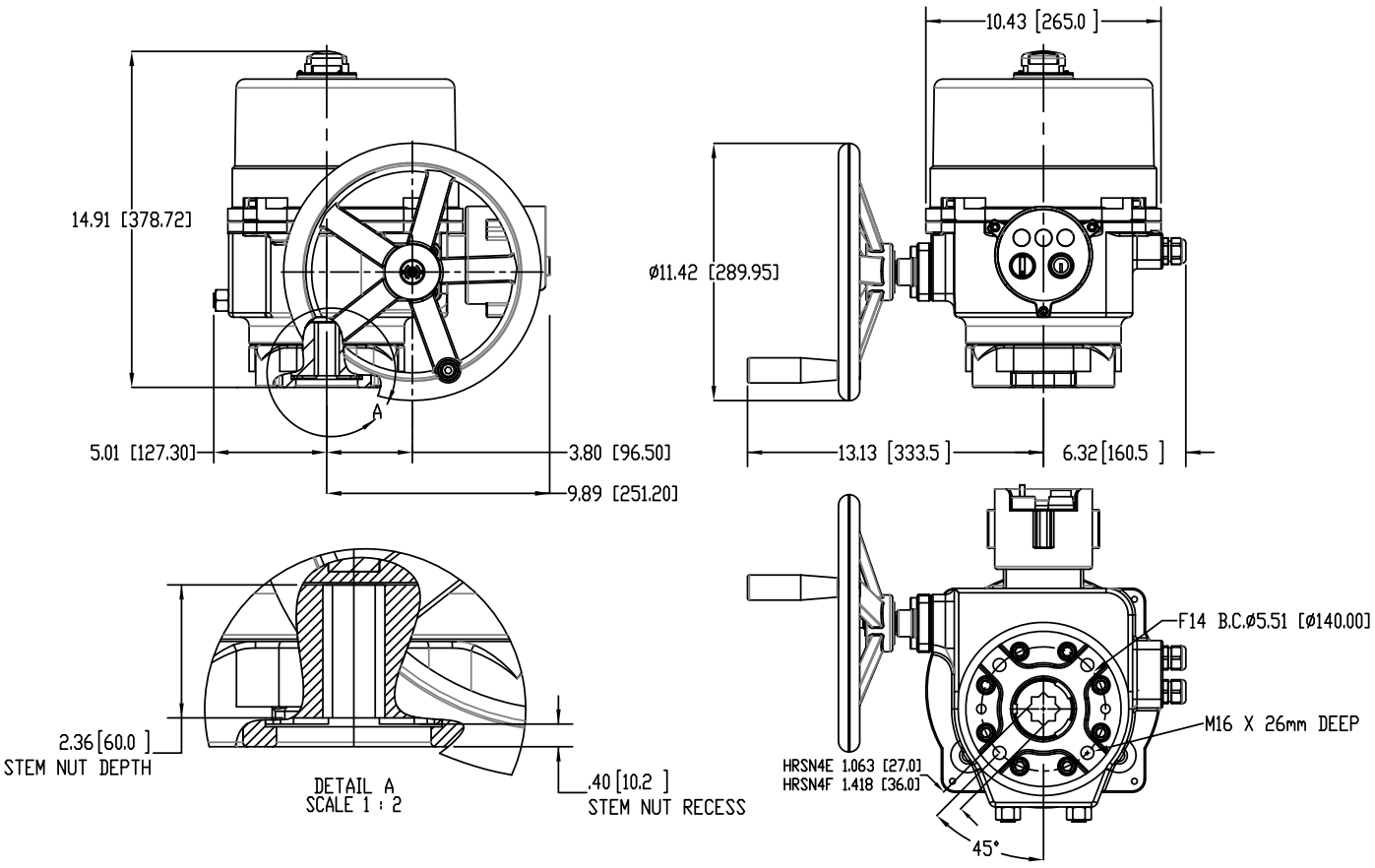
	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCKCB3A	8 / 200	4.79 / 122	12.5 turns 90°	35.2 / 16
HRCKCB3B	8 / 200	4.79 / 122	12.5 turns 90°	35.2 / 16

MECHANICAL DATA



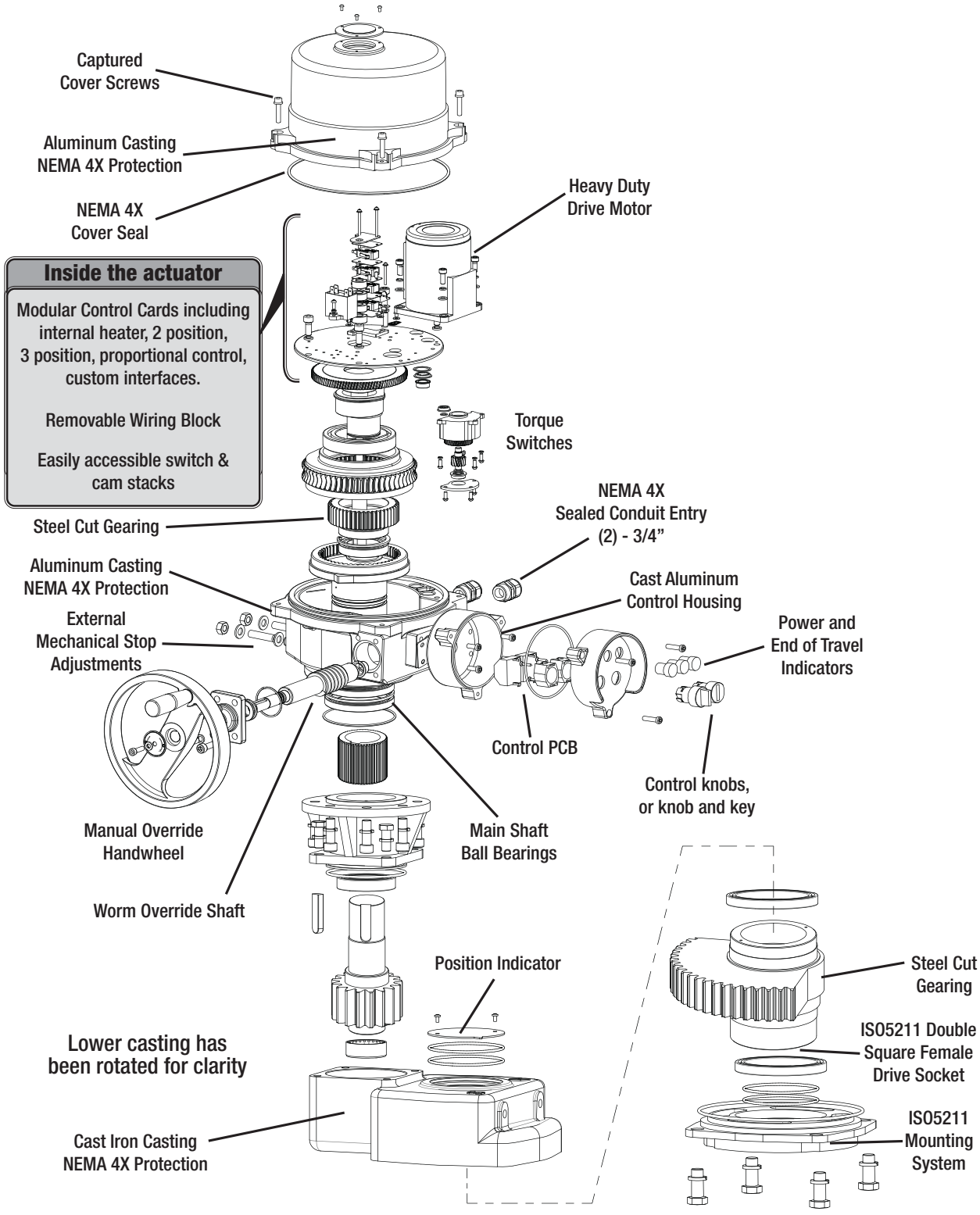
	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCKCB4A	8 / 200	7.76 / 197	14.5 turns 90°	60.5 / 27.5
HRCKCB4B	8 / 200	7.76 / 197	14.5 turns 90°	60.5 / 27.5
HRCKCB4C	8 / 200	7.76 / 197	14.5 turns 90°	60.5 / 27.5
HRCKCB4D	8 / 200	7.76 / 197	14.5 turns 90°	60.5 / 27.5

MECHANICAL DATA

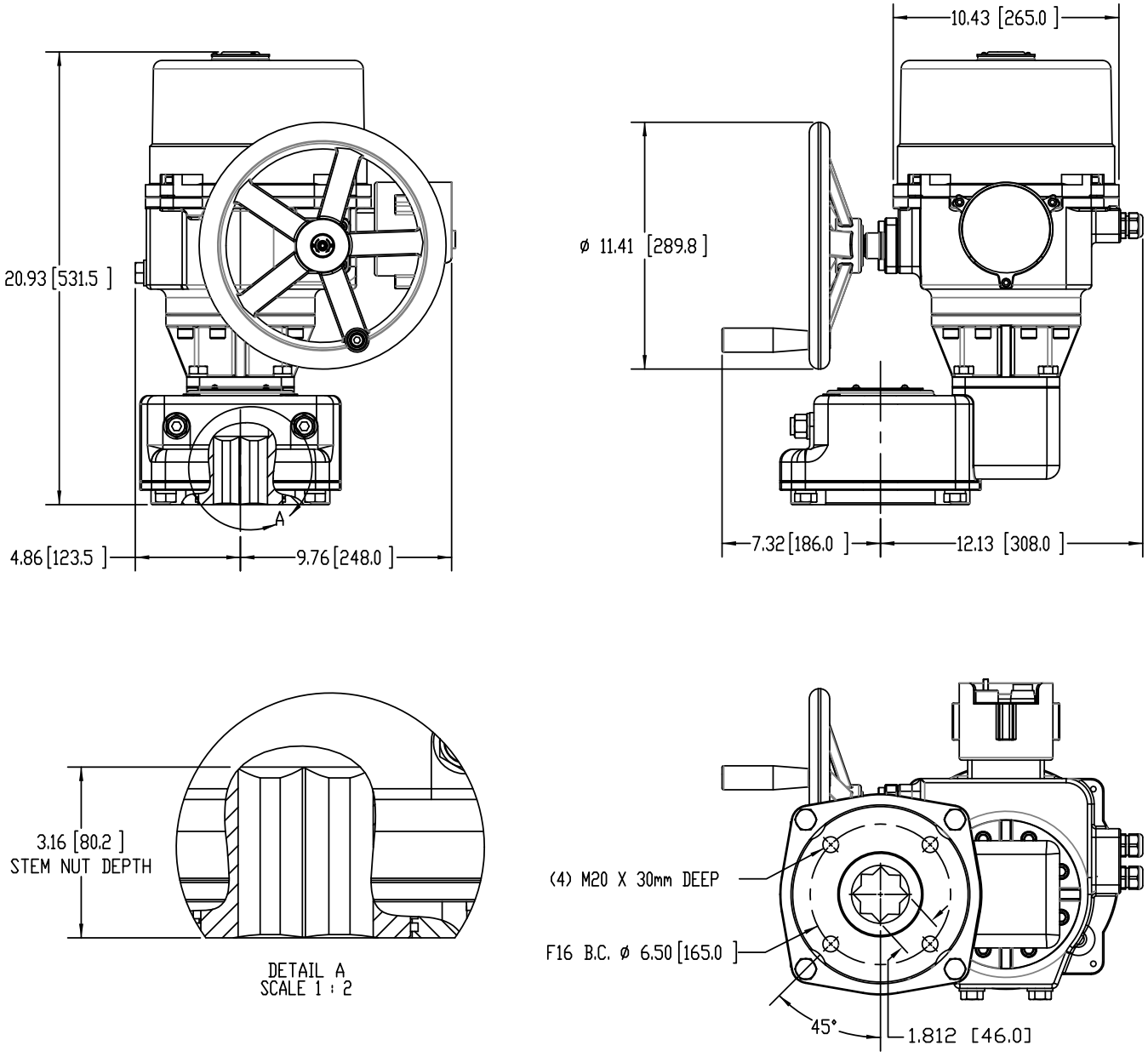


	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCKCB4E	9.84 / 250	11.42 / 290	16 turns 90°	92.4 / 42
HRCKCB4F	9.84 / 250	11.42 / 290	16 turns 90°	92.4 / 42

EXPLODED VIEW
HRCK, HRCB 5A~6A

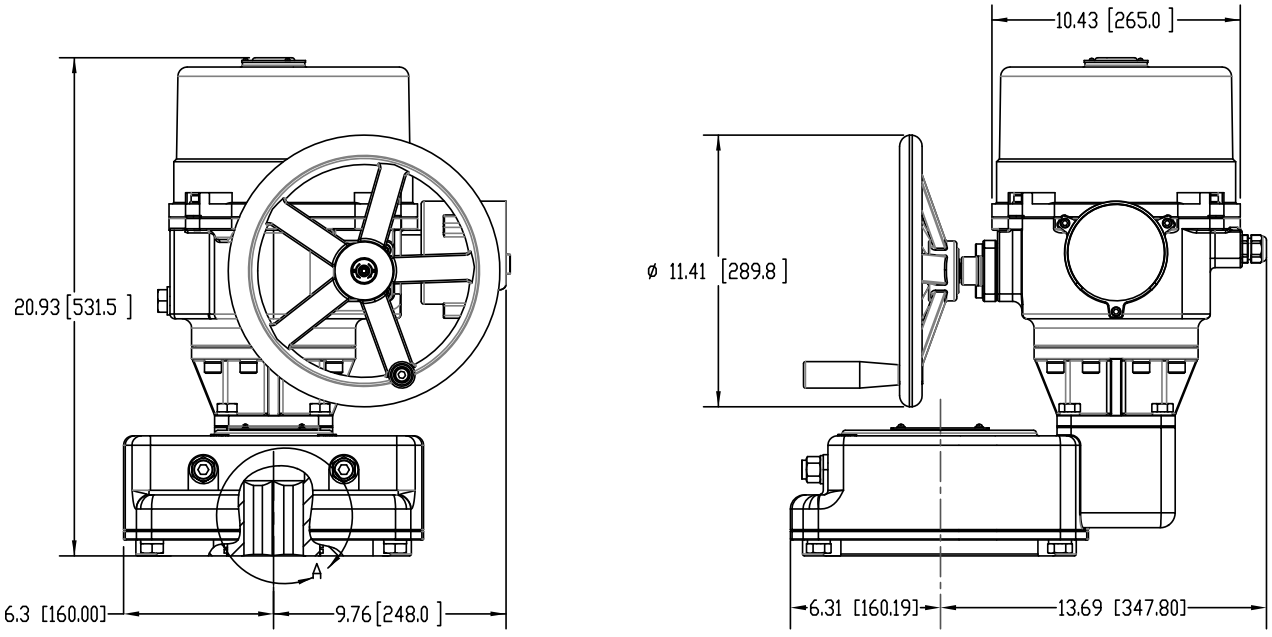


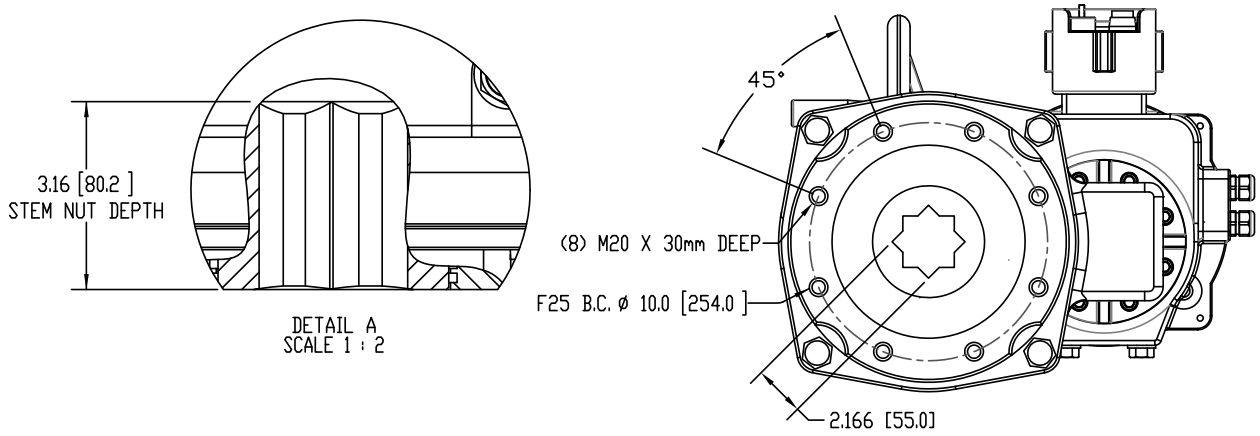
MECHANICAL DATA



	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCKCB5A	9.84 / 250	11.41 / 290	35.6 turns 90°	180.4 / 82
HRCKCB5B	9.84 / 250	11.41 / 290	35.6 turns 90°	180.4 / 82

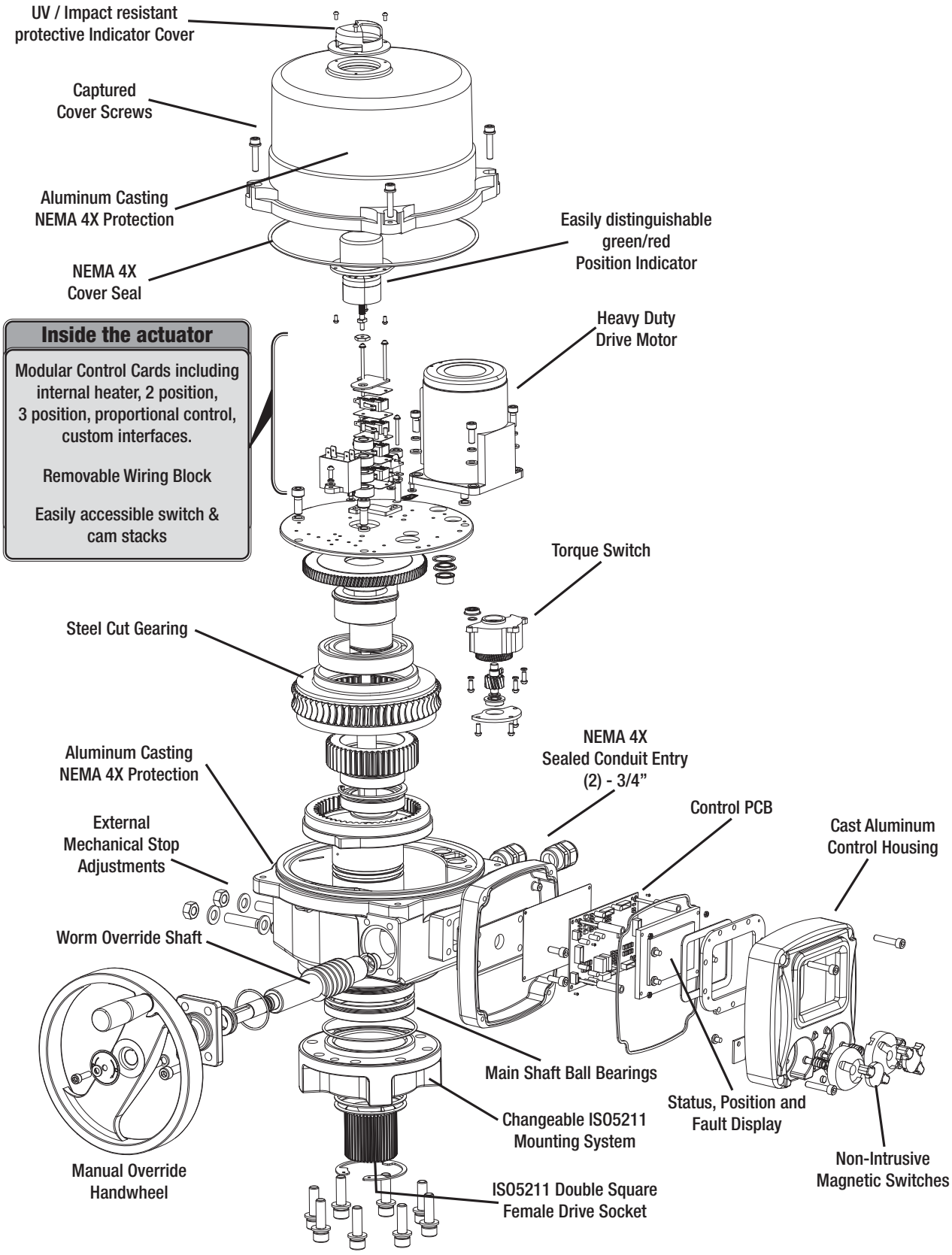
MECHANICAL DATA



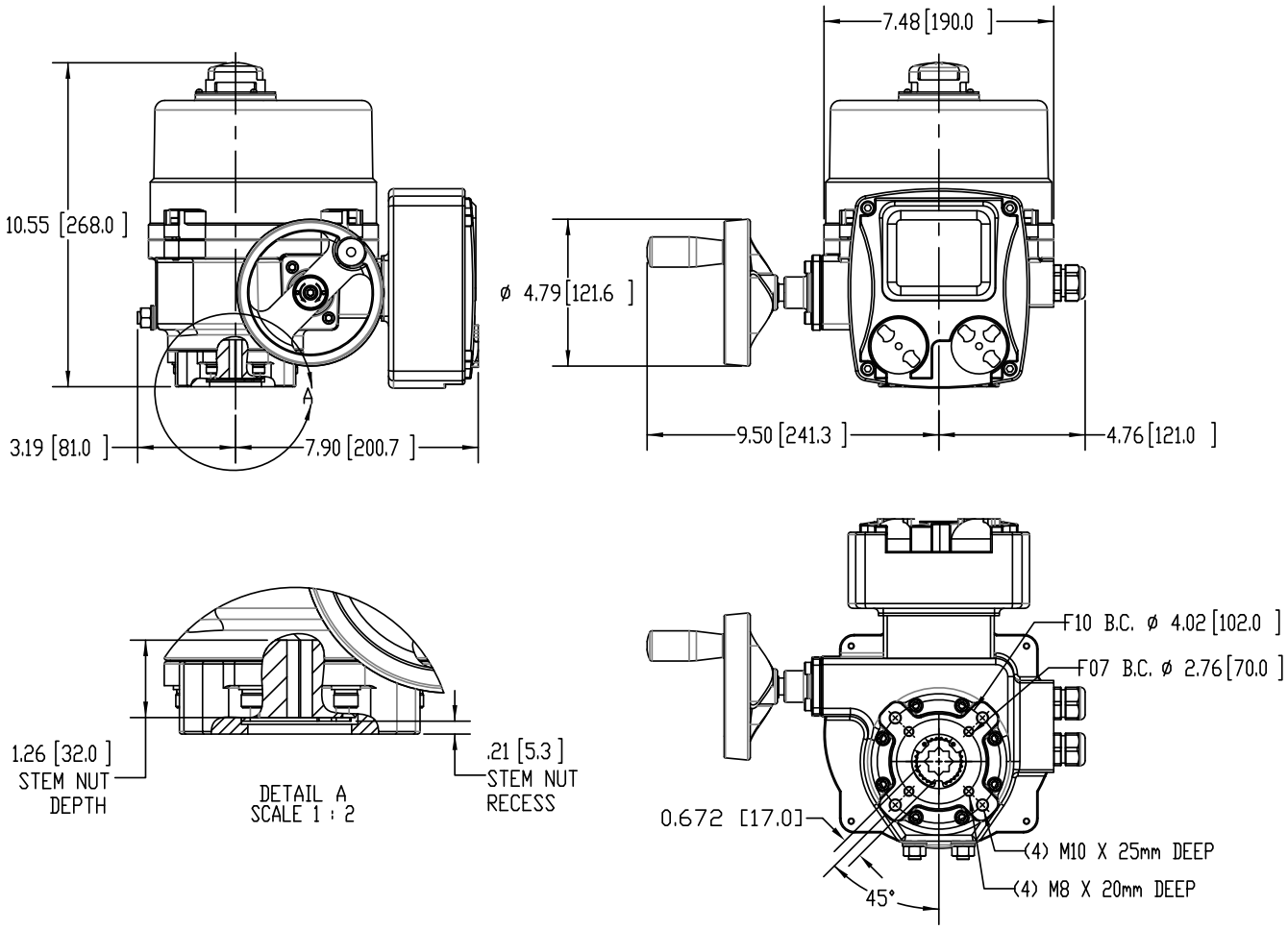


	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCKCB6A	9.84 / 250	11.41 / 290	48 turns 90°	248.6 / 113

MECHANICAL DATA

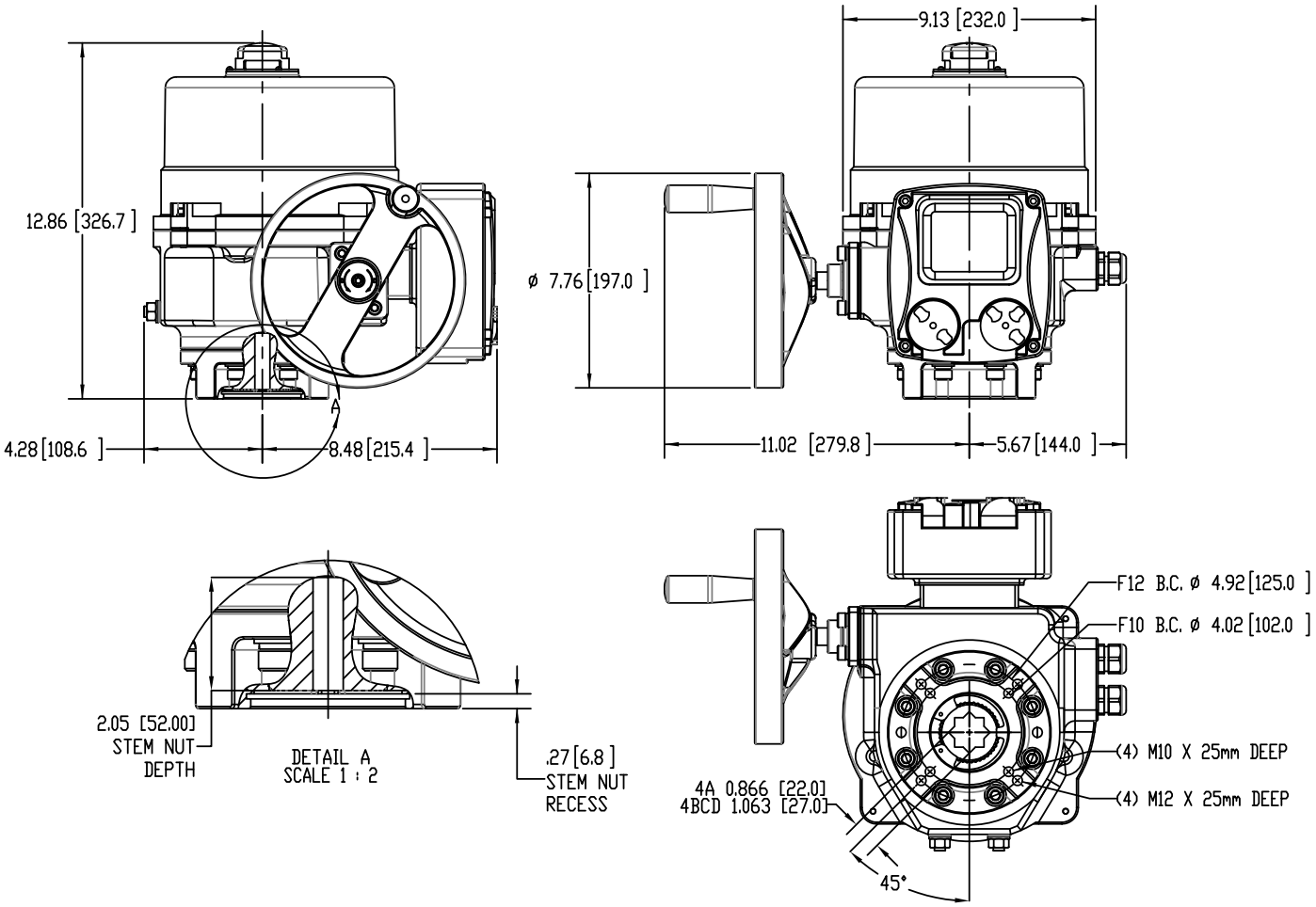


MECHANICAL DATA



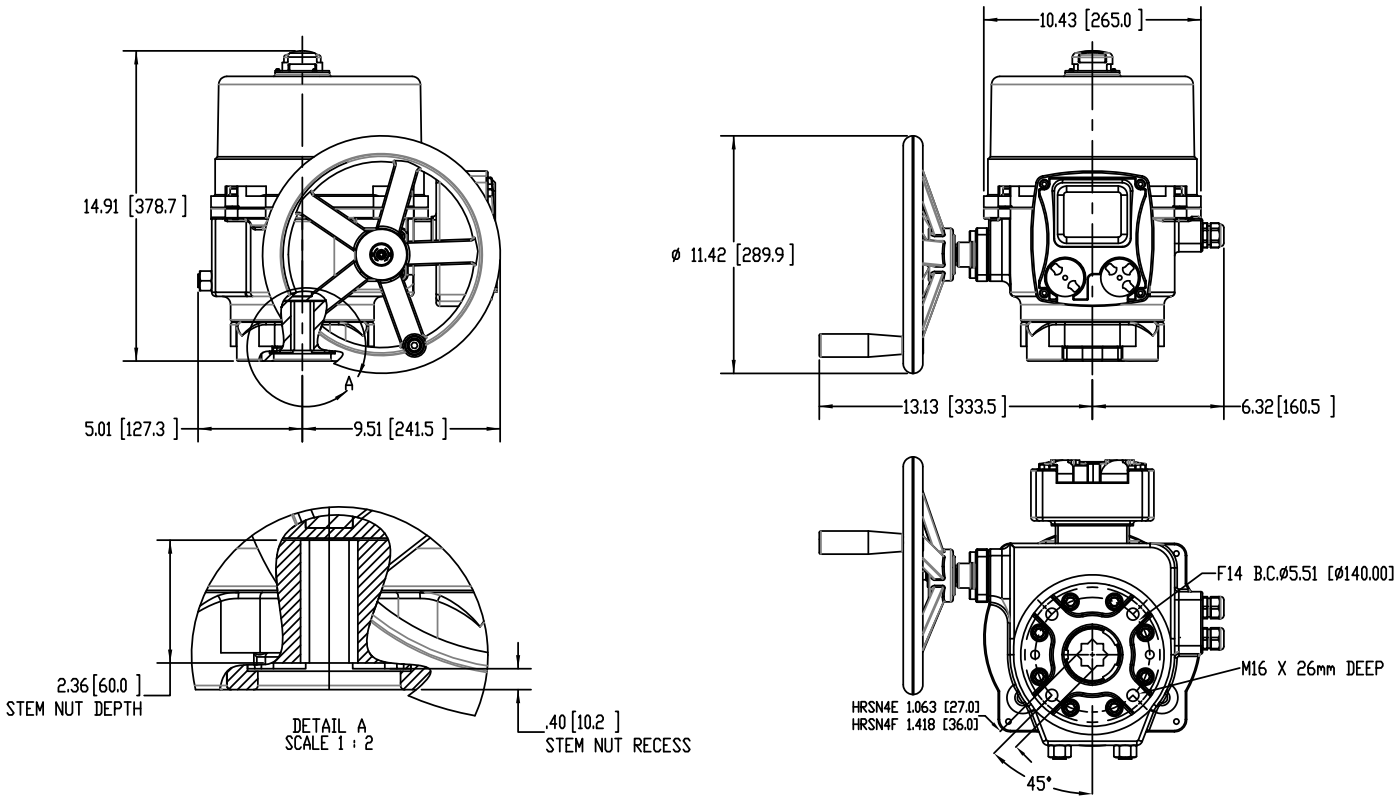
	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCLCD3A	8 / 200	4.79 / 122	12.5 turns 90°	37.4 / 17
HRCLCD3B	8 / 200	4.79 / 122	12.5 turns 90°	37.4 / 17

MECHANICAL DATA



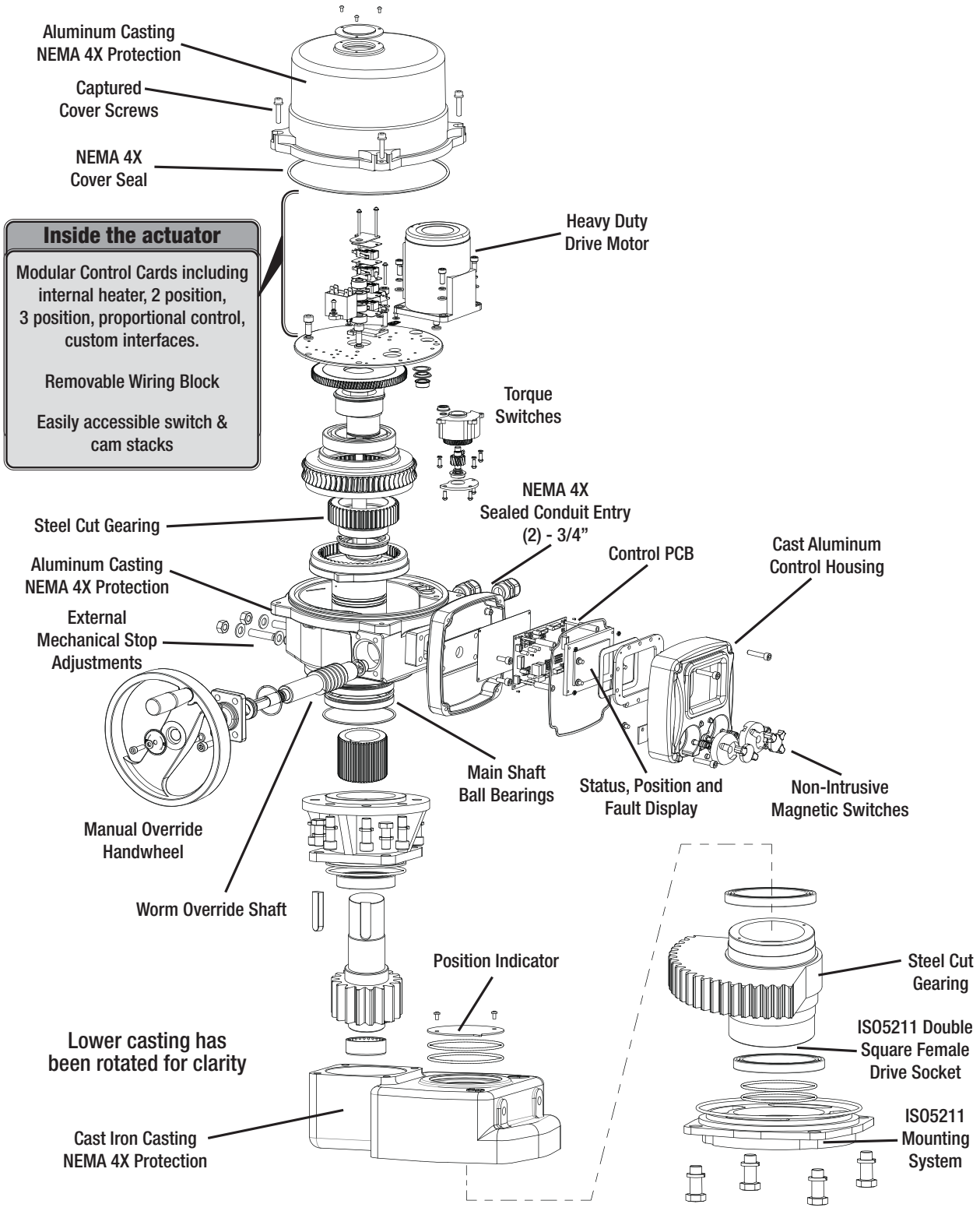
	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCLCD4A	8 / 200	7.76 / 197	14.5 turns 90°	62.7 / 29
HRCLCD4B	8 / 200	7.76 / 197	14.5 turns 90°	62.7 / 29
HRCLCD4C	8 / 200	7.76 / 197	14.5 turns 90°	62.7 / 29
HRCLCD4D	8 / 200	7.76 / 197	14.5 turns 90°	62.7 / 29

MECHANICAL DATA

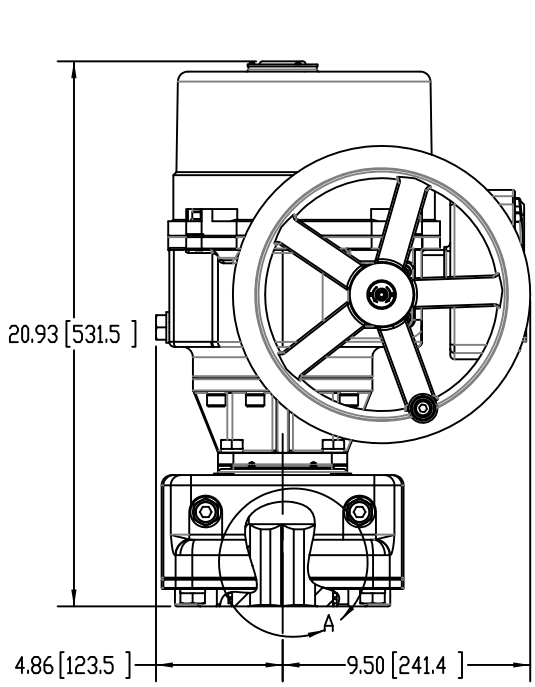


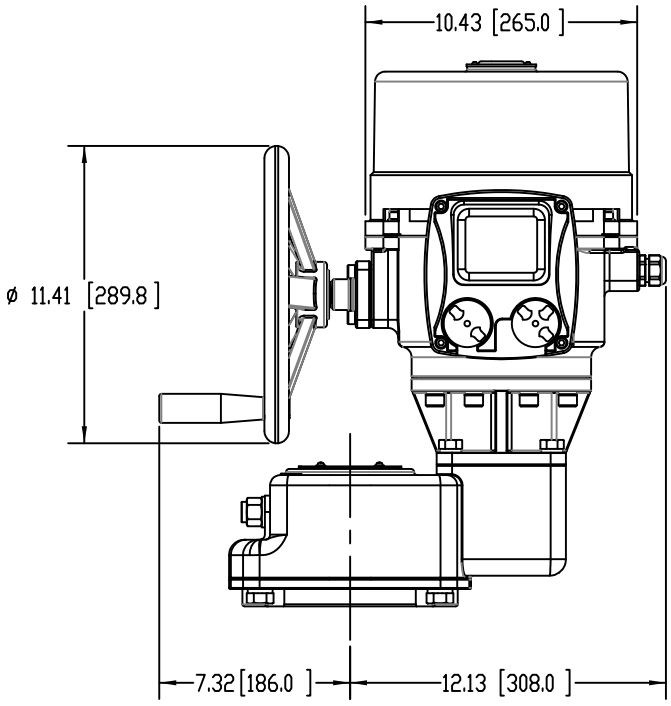
	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCLCD4E	9.84 / 250	11.42 / 290	16 turns 90°	94.6 / 43
HRCLCD4F	9.84 / 250	11.42 / 290	16 turns 90°	94.6 / 43

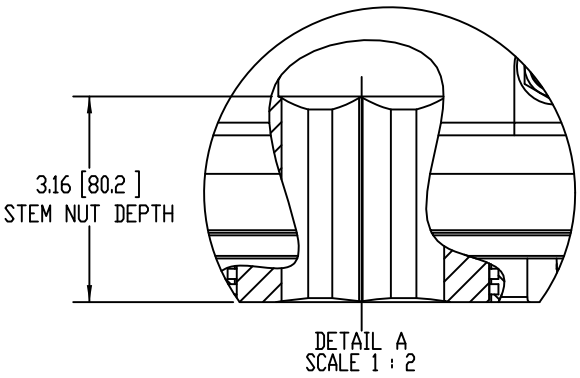
EXPLODED VIEW
HRCL, HRCD 5A~6A

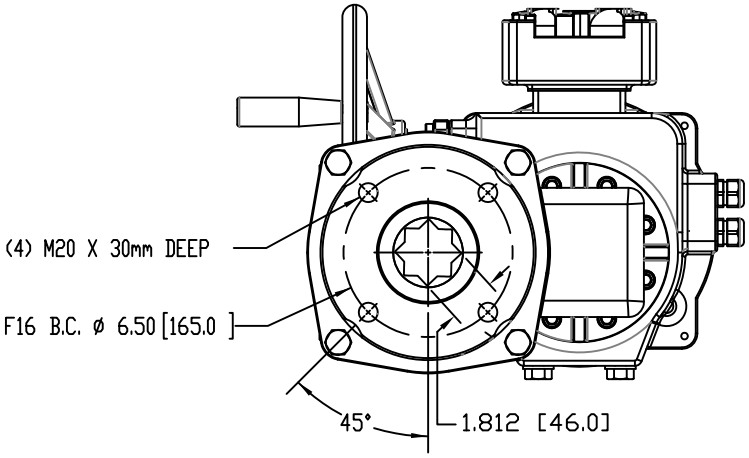


MECHANICAL DATA



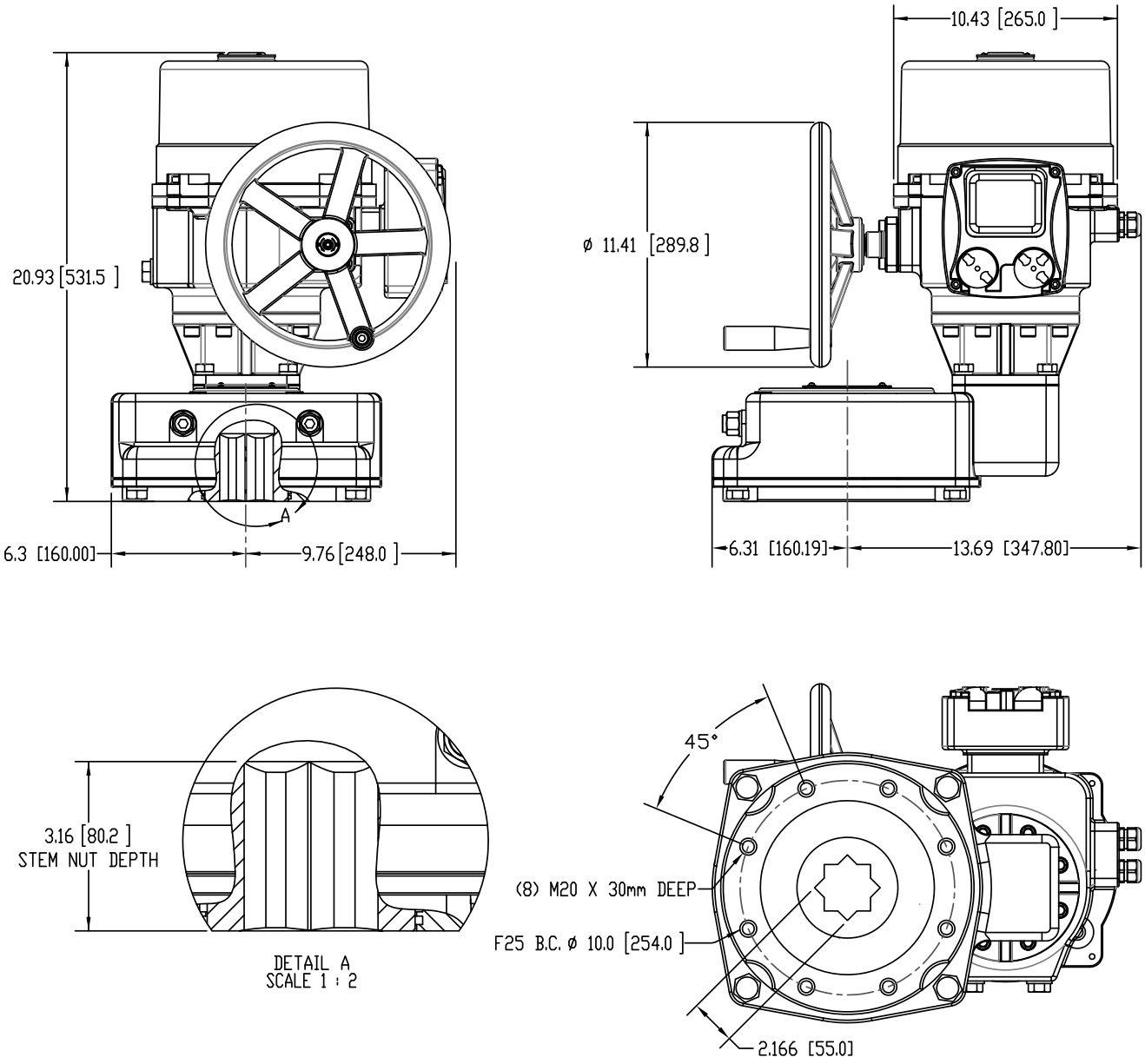






	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCLCD5A	9.84 / 250	11.41 / 290	35.6 turns 90°	182.6 / 83
HRCLCD6B	9.84 / 250	11.41 / 290	35.6 turns 90°	182.6 / 83

MECHANICAL DATA



	COVER REMOVAL CLEARANCE	HANDWHEEL		WEIGHT
MODEL	IN/MM	IN/MM	# TURNS FOR 90°	LBS/KG
HRCLCD6A	9.84 / 250	11.41 / 290	48 turns 90°	250.8 / 114