

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

RELAYS

PART#	DESCRIPTION
	<p>MASTER VALVE RELAY ASSEMBLY</p> <p>The Controller Assembly shall be provided with a Master Valve Relay assembly for the purpose of multiple controller operation of a single normally closed master valve. This assembly shall consist of a relay mounted on the terminal interface board. One MVR is required for each and all controllers sharing a single master valve.</p>
MVR	<p>Master Valve Relays are not required for normally open master valves. If a controller is intended to control or operate a booster pump, the MVR may be used concurrently. No Pump Start Relay will be necessary in this case. This applies to normally open master valves only. With normally open master valves, an extra station on the controller may be necessary to utilize system shut-off capabilities. (Not to be used with Rain Master Controllers – See Rain Master Options Sheet).</p>
	<p>PUMP START RELAY ASSEMBLY</p> <p>The Controller Assembly shall be provided with a Pump Start Relay assembly for the purpose of controller initiated pump operation. This assembly shall consist of a relay pre-wired to a terminal strip. One PSR is required for each controller.</p> <p>A PSR is not required when Master Valve Relay(s) are being used simultaneously. The MVR may be used in lieu of the PSR.</p>
PSR	
	<p>MULTI-PURPOSE RELAY ASSEMBLY</p> <p>The Controller Assembly shall be provided with a Multi-Purpose Relay assembly for the purpose of operating other external devices other than a master valve or pump. This assembly shall consist of a relay mounted on the terminal interface board. One MPR is required for each and all controllers sharing a single device.</p>
MPR	
	<p>FLOW SENSOR RELAY ASSEMBLY</p> <p>The Controller Assembly shall be provided with a Sensor Relay assembly for the purpose of disengaging the flow sensor operation when system flow recording is not desired due to external device operation. This assembly shall consist of a relay mounted on the terminal interface board. The FSR includes a pump start, master valve start, and flow start relay. One FSR is required for two controllers sharing a single flowsensor.</p>
FSR	

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Surge Protection and Master Valve Timer, and Grounding Equipment

PART#	DESCRIPTION
SP	<p>SURGE PROTECTION – 120V. The Controller Assembly shall be provided with an 110V. Surge Protection assembly for the purpose of protecting the components against electrical surge coming in on the 120 volt A.C. power source wiring. This assembly shall consist of a surge arrester installed on each leg of the 120 volt A.C. wiring to the equipment and housed in an electrical enclosure within the assembly. The SP is located at the point where the electrical power enters the assembly</p>
MVPE	<p>MASTER VALVE POWER (VARIABLE) ASSEMBLY The Controller Assembly shall be provided with a Master Valve Power assembly for the purpose of powering the master valve circuit independent of controller operation to pressurize the mainline for supplemental watering. This assembly shall consist of a timing module (with variable timing in thirty minute increments for up to three hours) mounted to the face of the backboard and pre-wired to a terminal interface board.</p>
MVPE	<p>MASTER VALVE POWER (VARIABLE) ASSEMBLY ENCLOSURE MOUNTED The Controller Assembly shall be provided with a Master Valve Power assembly for the purpose of powering the master valve circuit independent of controller operation to pressurize the mainline for supplemental watering. This assembly shall consist of a timing module (with variable timing in thirty minute increments for up to three hours) mounted to the face of the backboard and pre-wired to a terminal interface board. The MVPE shall include a small lockable stainless steel box for housing the power switch.</p>
GR-K	<p>8' GROUND ROD and CLAMP The Controller Assembly shall be provided with an 5/8" x 8' Ground Rod, 5/8" Clamp, and 10' of #6 bare ground wire for the purpose of providing grounding protection to the controller electrical components. GP8-K 8' GROUND PLATE and 25' of #6 GROUND WIRE</p>
GP8-K	<p>8' GROUND PLATE and 25' of #6 GROUND WIRE The Controller Assembly shall be provided with a 4" x 96" Copper Ground Plate, and 25' of #6 ground wire for the purpose of providing grounding protection to the controller electrical components. The #GP8-K Kit shall be used primarily with an 8' Ground Rod per National Electric Code requirements for grounding. Includes 2- 50 lb. bags of PowerFill™ or PowerSet® backfill material for ground plate installation.</p>
GP3-K	<p>3' GROUND PLATE and 10' of #6 GROUND WIRE The Controller Assembly shall be provided with a 4" x 36" Copper Ground Plate, and 10' of #6 ground wire for the purpose of providing grounding protection to the controller electrical components. The #GP3-K Kit shall be used primarily on two wire decoder system path grounding along with the specific manufacturer's surge suppression device per each specific manufacturer's grounding requirements. Includes 1- 50 lb. bag of PowerFill™ or PowerSet® backfill material for ground plate installation.</p>
TWIS	<p>TWO WIRE ISOLATION SWITCH The Controller Assembly shall be provided with Two Wire Isolation Switch (TWIS) for the purpose of isolating a two wire decoder system two wire path for troubleshooting up to three separate two wire paths at locations throughout a two wire run. The TWIS is designed to visually display short or no short conditions of the two wire decoder cable when the decoder controller indicates an alarm condition on one or up to three paths. The TWIS is fully water proof and designed to be mounted in a separately supplied valve box in the field. Typically placed at tee intersections of the two wire decoder path, no more than four should be placed on a single decoder controller system.</p>

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Sensor Equipment (Flow, Rain, and Wind Sensors) – FLOW SENSOR/WATER METER ONLY

PART#	DESCRIPTION
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DATA INDUSTRIAL® FLOW SENSOR

Only (For controllers with integrated or built in flow management capabilities)The Controller Assembly shall be provided with a Data Industrial Flow Sensor assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a tee mounted flow sensor* only for installation in the piping system.

IFS-XXX

(The IFS Series Flow Sensors may be used with ETwater, Irritrol MC-E, HydroPoint, Rain Master, Hunter ICORE and ACC, Tucor, and Netafim controllers. Please contact your representative for clarification of equipment requirements for these controllers as each manufacturer may have specific requirements).

PART#	Sensor Size	Velocity (FPS)	Low/High Flow Range
IFS-100	1" Brass	5 – 7.5 FPS	2-30 GPM
IFS-125	1 ¼" Brass	5 – 7.5 FPS	3-50 GPM
IFS-150	1 ½" PVC/Brass	5 – 7.5 FPS	6-60 GPM
IFS-200	2" PVC	5 – 7.5 FPS	10-130 GPM
IFS-250	2 ½" Brass	5 – 7.5 FPS	20-175 GPM
IFS-300	3" PVC	5 – 7.5 FPS	40-300 GPM
IFS-400	4" PVC	5 – 7.5 FPS	60-500 GPM
*IFS-600+	6-10" Brass Insert	5 – 7.5 FPS	75-1000 GPM

PART#	DESCRIPTION
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CST FLOW SENSOR

Only (For controllers with integrated or built in flow management capabilities)The Controller Assembly shall be provided with a Creative Sensor Technology (CST) Flow Sensor assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a tee mounted flow sensor* only for installation in the piping system.

IFS-XXX C

(The IFS Series Flow Sensors may be used with Baseline, Calsense, ETwater, HydroPoint, Rain Bird, RainMaster, Hunter and, Tucor, and Weathermatic controllers. Please contact your representative for clarification of equipment requirements for these controllers as each manufacturer may have specific requirements).

PART#	Sensor Size	Velocity Range (FPS)	Low/High Flow Range
IFS-075CLF (Low Flow)	3/4" PVC	5 – 7.5 FPS	.2-20 GPM
IFS-100CLF (Low Flow)	1 ¼" Brass	5 – 7.5 FPS	.2-20 GPM
IFS-100C	1 " PVC/Brass	5 – 7.5 FPS	1-25 GPM
IFS-150C	1 ½" PVC /Brass	5 – 7.5 FPS	1.5-54 GPM
IFS-200C	2" PVC	5 – 7.5 FPS	3-85 GPM
IFS-300C	3" PVC Saddle	5 – 7.5 FPS	6-185 GPM
IFS-400C	4" PVC Saddle	5 – 7.5 FPS	10-300 GPM
IFS-600C	6" PVC Saddle	5 – 7.5 FPS	45-XXX GPM

*Based on 7 ½ fps water velocity

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Sensor Equipment (Flow, Rain, and Wind Sensors) – FLOW SENSOR/WATER METER ONLY

PART#	DESCRIPTION
IFS-XXX F	FLOMEC® ULTRASONIC FLOW METER
	Only (For controllers with integrated or built in flow management capabilities)The Controller Assembly shall be provided with a Flomec® Ultrasonic Flow Meter assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a tee mounted flow sensor* only for installation in the piping system.

PART#	Sensor Size	Velocity (FPS)	Low/High Flow Range
IFS-100F	1" PVC Sch. 80	5 – 7.5 FPS	.5-40 GPM
IFS-150F	1 ½" PVC Sch. 80	5 – 7.5 FPS	1-80 GPM
IFS-200F	2" PVC Sch.8	5 – 7.5 FPS	2- 150 GPM
IFS-300F	3" PVC Sch.8	5 – 7.5 FPS	4-300 GPM
IFS-400F	4" PVC Sch.8	5 – 7.5 FPS	8-600 GPM

*Based on 7 ½ fps water velocity

PART#	DESCRIPTION
IFS-XXXN	NETAFIM™ FLOW SENSOR/WATER METER
	(For controllers with integrated or built in flow management capabilities)The Controller Assembly shall be provided with a Flow Sensor assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a cast iron flow sensor for installation in the piping system and Sensor Ratio Adapter for compatibility with any controller. The sensor/meter includes a standard meter register for totalizing flow (GPM) and leak detection.

PART#	Sensor Size	Velocity Range (FPS)	Low/High Flow Range	Head Loss
IFS-075N	3/4" Union/MPT	5 – 7.5 FPS	.9-14 GPM	4 PSI
IFS-100N	1" Union/MPT	5 – 7.5 FPS	1.2-20 GPM	3.8 PSI
IFS-150N	1 ½" Union/MPT	5 – 7.5 FPS	3.5-55 GPM	2.4 PSI
IFS-200N	2" Union/MPT	5 – 7.5 FPS	8.8-110 GPM	1.5 PSI
IFS-300N	3" Flanged	5 – 7.5 FPS	4-660 GPM	3.4 PSI
IFS-400N	4" Flanged	5 – 7.5 FPS	8-1266 GPM	1.8 PSI
IFS-600N	6" Flanged	5 – 7.5 FPS	15-1431 GPM	1.8 PSI

Note: The flow range is based on accuracy of +/-2%, Friction loss vary by size psi. Head loss based on mid-flow ranges.

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Sensor Equipment (Flow, Rain, and Wind Sensors) – FLOW SENSOR/WATER METER ONLY

PART#	DESCRIPTION
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IF5-XXXT **TORO® FLOW SHUT-OFF ASSEMBLY**
 (For use with Irritrol MCE Controllers only)(TF series is for normally closed master valves and TFO for normally open master valves)
 The Controller Assembly shall be provided with a Toro® Flow Sensor assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a tee mounted flow sensor for installation in the piping system.

PART#	Pipe Size	Velocity (FPS)	High Flow Range
IFS-075T	3/4"	5 – 7.5 FPS	.5-40 GPM
IFS-100T	1"	5 – 7.5 FPS	5-*30 GPM
IFS-150T	1 1/2"	5 – 7.5 FPS	5-*60 GPM
IFS-200T	2"	5 – 7.5 FPS	10-*130 GPM
IFS-300T	3"	5 – 7.5 FPS	20-*175 GPM
IFS-400T	4"	5 – 7.5 FPS	40-*350 GPM

*The lower high flow gpm is based on a velocity not exceeding 5 ft/sec. for Class 200 IPS pipe and pressures that do not exceed 150 PSI.

PART#	DESCRIPTION
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OCT-XXXN **NETAFIM™OCTAVE® FLOW SENSOR/WATER METER**
 (For controllers with integrated or built in flow management capabilities)
 The Controller Assembly shall be provided with an OCTAVE® Ultrasonic Flow Sensor assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a cast iron flow sensor for installation in the piping system. The Octave® sensor/meter includes a standard meter register for totalizing flow (GPM) and leak detection. **Includes I.T.S. Flow Sensor Board #FSB.**

PART#	Pipe Size	Velocity (FPS)	Flow Range	Head Loss
OCT-200N	2" Flanged	5 – 7.5 FPS	0.25-250 GPM	
OCT-300N	3" Flanged	5 – 7.5 FPS	0.50-500 GPM	
OCT-400N	4" Flanged	5 – 7.5 FPS	0.75 - 1000 GPM	
OCT-600N	6" Flanged	5 – 7.5 FPS	2 - 2000 GPM	
OCT-800N	8" Flanged	5 – 7.5 FPS	40-*350 GPM	

*The lower high flow gpm is based on a velocity not exceeding 5 ft/sec. for Class 200 IPS pipe and pressures that do not exceed 150 PSI.

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Sensor Equipment (Flow, Rain, and Wind Sensors)

FLOW SENSOR/WATER METER WITH FLOW TRANSMITTER or MONITOR

PART#	DESCRIPTION
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DATA INDUSTRIAL® HIGH FLOW SHUT-OFF ASSEMBLY W/ TRANSMITTER

(HF is for normally closed master valve and HFO is for normally open master valve applications.)

The Controller Assembly shall be provided with a High Flow shut-off assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of an adjustable relay control device pre-wired to a terminal strip, with enclosure-mounted system shut down indication light, reset switch and a tee mounted flow sensor* for installation in the piping system.

HF/HFO-XXX

(The HF Series Assemblies do not apply to Calsense, ETwater, Hunter I CORE & ACC, HydroPoint, Irritrol MC-E, Netafim, Rain Master, or Tucor Controllers when using a single controller with a single master valve/flow sensor. The HF Series could apply to applications of multiple controllers sharing a single master valve/flow sensor. Please contact your representative for clarification of equipment requirements for these controllers.)

PART#	Sensor Size	Velocity (FPS)	High Flow Range
HF-075/HFO-075	3/4" Brass	5 – 7.5 FPS	1-17 GPM
HF-100/HFO-100	1" Brass	5 – 7.5 FPS	2-30 GPM
HF-125/HFO-125	1 ¼" Brass	5 – 7.5 FPS	3-50 GPM
HF-150/HFO-150	1 ½" PVC/Brass	5 – 7.5 FPS	6-60 GPM
HF-200/HFO-200	2" PVC	5 – 7.5 FPS	10-130 GPM
HF-250/HFO-250	2 ½" Brass	5 – 7.5 FPS	20-175 GPM
HF-300/HFO-300	3" PVC	5 – 7.5 FPS	40-300 GPM
HF-400/HFO-400	4" PVC	5 – 7.5 FPS	60-500 GPM
*HF-600+/HFSO-600+	6-10" Insert only	5 – 7.5 FPS	75-1000 GPM

* Note: The HF/HFO-600+ Series shall include an insert sensor only. A tee or saddle is not included. The contractor shall be responsible for providing the appropriate tee or saddle type (brass, pvc, flanged etc.).

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Sensor Equipment (Flow, Rain, and Wind Sensors)

FLOW SENSOR/WATER METER WITH FLOW TRANSMITTER or MONITOR

PART#	DESCRIPTION
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HFM/HFMO-XXXC
CST® HIGH FLOW SHUT-OFF and MONITOR ASSEMBLY
 (HFM is for a normally closed master valve and HFMO is for a normally open master valve applications.) The Controller Assembly shall be provided with a High Flow shut-off and Monitor assembly for use in conjunction with a master valve to digitally monitor current and total flow inputs and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a **Data Industrial® tee mounted flow sensor and a Flow Guard Flow Monitor pre-wired to a terminal strip.** (The HFM Series Assemblies do not apply to Calsense, ETwater, Hunter ICORE & ACC, HydroPoint, Irritrol MC-E, Netafim, Rain Master, or Tucor Controllers when using a single controller with a single master valve/flow sensor. The HFM Series could apply to applications of multiple controllers sharing a single master valve/flow sensor. Please contact your representative for clarification of equipment requirements for these controllers.)

PART#	Sensor Size	Velocity (FPS)	High Flow Range
HF-075/HFO-075	3/4" Brass	5 – 7.5 FPS	1-17 GPM
HF-100/HFO-100	1" Brass	5 – 7.5 FPS	2-30 GPM
HF-125/HFO-125	1 ¼" Brass	5 – 7.5 FPS	3-50 GPM
HF-150/HFO-150	1 ½" PVC/Brass	5 – 7.5 FPS	6-60 GPM
HF-200/HFO-200	2" PVC	5 – 7.5 FPS	10-130 GPM
HF-250/HFO-250	2 ½" Brass	5 – 7.5 FPS	20-175 GPM
HF-300/HFO-300	3" PVC	5 – 7.5 FPS	40-300 GPM
HF-400/HFO-400	4" PVC	5 – 7.5 FPS	60-500 GPM
*HF-600+/HFSO-600+	6-10" Insert only	5 – 7.5 FPS	75-1000 GPM

* Note: The HF/HFO-600+ Series shall include an insert sensor only. A tee or saddle is not included. The contractor shall be responsible for providing the appropriate tee or saddle type (brass, pvc, flanged etc.).

PART#	DESCRIPTION
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HFM/HFMO-XXXN
NETAFIM™ FLOW SENSOR/WATER METER with FLOW MONITOR
 (HFM is for a normally closed master valve and HFMO is for a normally open master valve applications.) The Controller Assembly shall be provided with a High Flow shut-off and Monitor assembly for use in conjunction with a master valve to digitally monitor current and total flow inputs and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a **Data Industrial® tee mounted flow sensor and a Flow Guard Flow Monitor pre-wired to a terminal strip.** (The HFM Series Assemblies do not apply to Calsense, ETwater, Hunter ICORE & ACC, HydroPoint, Irritrol MC-E, Netafim, Rain Master, or Tucor Controllers when using a single controller with a single master valve/flow sensor. The HFM Series could apply to applications of multiple controllers sharing a single master valve/flow sensor. Please contact your representative for clarification of equipment requirements for these controllers.)

PART#	Sensor Size	Velocity (FPS)	High Flow Range
HFM-100C/HFMO-100C	1" PVC	5 – 7.5 FPS	1-25 GPM
HFM-150C/HFMO-150C	1 ½" PVC	5 – 7.5 FPS	1.5-54 GPM
HFM-200C/HFMO-200C	2" PVC	5 – 7.5 FPS	3-85 GPM
HFM-300C/HFMO-300C	3" PVC	5 – 7.5 FPS	6-185 GPM
HFM-400C/HFMO-400C	4" PVC	5 – 7.5 FPS	10-300 GPM

Note: The flow range is based on accuracy of +/-2%, Friction loss vary by size psi. Head loss based on mid-flow ranges.

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Sensor Equipment Cont. – HYDROMETERS

PART#	DESCRIPTION
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FSVM/FSVMO-XXXN **NETAFIM™ FLOW SENSOR/MASTER VALVE (Hydrometer) with FLOW MONITOR**
 The Controller Assembly shall be provided with a Hydrometer assembly for use in conjunction with a master valve to monitor and shut down the irrigation system in the event of an excess flow condition. This assembly shall consist of a cast iron hydrometer for installation in the piping system and **Flow Guard Flow Monitor**. The sensor/meter includes a standard meter register for totalizing flow (GPM) and leak detection. The Flow Guard Flow Monitor is a designed to receive input from Netafim™ Flow Meters and Hydrometers.

PART#	Sensor Size	Velocity (FPS)	High Flow Range	Head Loss
FSVM/FSVMO -150N	1 ½" Union/MPT	5 – 7.5 FPS	1.8-55 GPM	2.4 PSI
FSVM/FSVMO -200N	2" Union/FPT	5 – 7.5 FPS	5.3-95 GPM	1.5 PSI
FSVM/FSVMO -300N	3" Flanged	5 – 7.5 FPS	14-220 GPM	3.4 PSI
FSVM/FSVMO -400N	4" Flanged	5 – 7.5 FPS	21-380 GPM	1.8 PSI
FSVM/FSVMO -600N	6" Flanged	5 – 7.5 FPS	53-660 GPM	1.6 PSI

Note: The flow range is based on accuracy of +/-2%, Friction loss vary by size psi. Head loss based on mid-flow ranges

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Sensor Equipment – High Flow Alarm Light and Rain Sensing

PART#	DESCRIPTION
FSB	<p>FLOW SENSOR BOARD</p> <p>(Included with all Hydrometers & Octave Sensors except where Flow Monitors are noted) The Controller Assembly shall be provided with Flow Sensor Board for the purpose of converting low frequency output to high frequency output specific to Netafim Flow Meters and Hydrometers with specific controllers to ensure proper signal is read at the controller. Consult your Imperial Technical Services representative for applications where this may apply.</p>
HFL	<p>HIGH FLOW ALARM LIGHT</p> <p>The Controller Assembly shall be provided with a High Flow Alarm Light assembly for the purpose of visual high flow condition when pre-wired to a flow sensor and master valve. This assembly shall consist of a pre-installed enclosure mounted light.</p>
RS	<p>RAIN SWITCH ASSEMBLY</p> <p>The Controller Assembly shall be provided with a Remote Rain Switch assembly for the purpose of shutting down the irrigation system during rainy weather conditions. This assembly shall consist of a MiniClik II rain switch, and a mounting bracket (for installation on a nearby structure). The rain switch interconnect wire harness shall be pre-wired through a bypass switch into the controller and to the terminal interface board. The Rain Switch shall actuate after rainfall quantities of 1/8", 1/4", 1/2", 3/4" or 1".</p>
RSE, RSE2	<p>RAIN SWITCH ENCLOSURE MOUNTED ASSEMBLY</p> <p>The Controller Assembly shall be provided with a Rain Switch Enclosure Mounted assembly for the purpose of shutting down the irrigation system during rainy weather conditions. This assembly shall consist of a Mini-Clik II rain switch (in a stainless steel, vandal-resistant housing) mounted on the right hand side of the enclosure. The rain switch interconnect wire harness shall be pre-wired through a bypass switch into the controller and to the terminal interface board. The Rain Switch shall actuate after user selected rainfall quantities of 1/8", 1/4", 1/2", 3/4" or 1". For two controllers, use part number RSE2. The RSE and RSE2 shall be UL Listed and Approved for any UL Listed and Approved stainless steel enclosure.</p>
WRS	<p>WIRELESS RAIN SWITCH ASSEMBLY (WRS, WRS2, WRS3, WRS4)</p> <p>The Controller Assembly shall be provided with a Wireless Remote Rain Switch assembly for the purpose of shutting down the irrigation system during rainy weather conditions. This assembly shall consist of a Wireless rain switch transmitter and mounting bracket (for installation on a nearby structure or pole no further than 300' away) and Controller Assembly mounted receiver. The rain switch receiver and bypass switch shall be pre-wired through into the controller and to the terminal interface board. The Rain Switch transmitter shall actuate after rainfall quantities of 1/8", 1/4", 1/2", 3/4" or 1".</p> <p>(The WRS2 shall allow wireless remote rain sensing for 2 controllers with one transmitter and two receivers. The WRS3 shall allow wireless remote rain sensing for 3 controllers with one transmitter and three receivers. The WRS4 shall allow wireless remote rain sensing for 4 controllers with one transmitter and four receivers.)</p>
HWS	<p>HIGH WIND SHUT-OFF ASSEMBLY</p> <p>The Controller Assembly shall be provided with a High Wind Shut-Off assembly for the purpose of shutting down the irrigation system during windy conditions. This assembly shall consist of a Hunter® Wind-Clik mounted on a building, pole, or other structure. The wind sensor interconnect wire harness shall be pre-wired to an adjustable set point relay into the controller and to the terminal interface board. The Wind Sensor shall actuate after winds of 12 mph to 35 mph are detected.</p>
HWSP	<p>HIGH WIND SHUT-OFF ASSEMBLY- POLE MOUNTED</p> <p>The Controller Assembly shall be provided with a High Wind Shut-Off assembly for the purpose of shutting down the irrigation system during windy conditions. This assembly shall consist of a Hunter® Wind-Clik mounted on a twelve foot by 2 inch pole. The wind sensor interconnect wire harness shall be pre-wired to an adjustable set point relay into the controller and to the terminal interface board. The Wind Sensor shall actuate after winds of 12 mph to 35 mph are detected.</p>
FAN	<p>ENCLOSURE FAN</p> <p>The Controller Assembly shall be provided with a forced air fan system for cooling the enclosure housing and components during high heat periods. The Enclosure Fan shall be pre-mounted and pre-wired in the assembly.</p>

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Remote Controls

PART#	DESCRIPTION
RRC	<p>REMOTE CONTROL RECEIVER CONNECTOR ASSEMBLY</p> <p>The Controller Assembly shall be provided with a Radio Remote Connector assembly for the purpose of facilitating remote radio operation of the irrigation system. This assembly shall consist of a universal receptacle mounted on the terminal interface board for hook up to a remote radio receiver. The RRC will handle up to 24 stations on a single controller. For a controller having more than 24 stations use 2 RRCs (2RRC).</p>
RMPMUA	<p>RAIN MASTER TRANSMITTER AND RECEIVER KIT – UNIVERSAL FOR ALL NON R.M. CONTROLLERS</p> <p>The Controller Assembly shall be provided with Transmitter and Receiver Kit for the purpose of remote valve operation for any manufacturer’s 24 volt controller. The #RMPMUA may control up to 999 receivers from a single transmitter and operates at a frequency of 154.600 MHz. The #RMPMUA Kit includes the transmitter, receiver, 36” remote cable, universal adapter, 30” permanent connector, transmitter and receiver antennas, and carrying case. For specific Rain Master remote options, see the Rain Master section in this binder.</p>
RMRX-12	<p>RECEIVER KIT – 12 STA. PERMANENT MOUNT FOR ALL NON R.M. CONTROLLERS</p> <p>The Controller Assembly shall be provided with permanent mount Receiver Kit for the purpose of remote valve operation for any manufacturer’s 24 volt controller up to 12 stations. Up to 999 #RMRX-12 may be controlled single transmitter and operates at a frequency of 154.600 MHz. The #RMRX-12 Kit includes the receiver, 32EX extension cable, Chassis Mount Access Door, and receiver antenna.</p>
RMRX-24	<p>RECEIVER KIT – 24 STA. PERMANENT MOUNT FOR ALL NON R.M. CONTROLLERS</p> <p>The Controller Assembly shall be provided with permanent mount Receiver Kit for the purpose of remote valve operation for any manufacturer’s 24 volt controller up to 12 stations. Up to 999 #RMRX-12 may be controlled single transmitter and operates at a frequency of 154.600 MHz. The #RMRX-12 Kit includes the receiver, 32EX extension cable, Chassis Mount Access Door, and receiver antenna.</p>
RMRX-32	<p>RECEIVER KIT – 12 STA. PERMANENT MOUNT FOR ALL NON R.M. CONTROLLERS</p> <p>The Controller Assembly shall be provided with permanent mount Receiver Kit for the purpose of remote valve operation for any manufacturer’s 24 volt controller up to 24 stations. Up to 999 #RMRX-24 may be controlled single transmitter and operates at a frequency of 154.600 MHz. The #RMRX-24 Kit includes the receiver, 32EX extension cable, Chassis Mount Access Door, and receiver antenna.</p>
RMTX-32	<p>TRANSMITTER KIT – FOR ALL CONTROLLER TYPES INCLUDING RAIN MASTER</p> <p>The Controller Assembly shall be provided with Transmitter Kit for the purpose of remote valve operation for any manufacturer’s 24 volt controller including all Rain Master controllers. The #RMTX may control up to 999 receivers from a single transmitter and operates at a frequency of 154.600 MHz. The #RMTX Kit includes the transmitter, transmitter antenna, and battery.</p>
RMANT-LP	<p>PERMANENT MOUNT LOW PROFILE CHASSIS ANTENNA</p> <p>The Controller Assembly shall be provided with permanent mount low profile antenna for the purpose of connecting to a permanent receiver. The #RMANT-LP is designed for mounting on a stainless steel enclosure and shall operate at a frequency of 154.600 MHz.</p>

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Remote Controls

PART#	DESCRIPTION
RMPMX-RBLX	<p>RAIN MASTER™ TRANSMITTER AND RECEIVER KIT FOR RAIN BIRD® LX SERIES CONTROLLERS ONLY</p> <p>The Controller Assembly shall be provided with Rain Master™ ProMax™ Transmitter and Receiver Kit for the purpose of remote valve operation for Rain Bird® LXME, LXMEF, or LX D Controllers. The #RMPMXRBLX may control up to 999 receivers from a single transmitter and operates at a frequency of 154.600 MHz. The #RMPMX-RBLX Kit includes the transmitter, receiver, 36" remote cable, universal adapter, 30" permanent connector, transmitter, permanent mount receiver, Rain Bird® remote adapter board, antenna, and carrying case.</p>
RMRX-RBLX	<p>RAIN MASTER™ RECEIVER KIT ONLY– PERMANENT MOUNT FOR RAIN BIRD® LX SERIES CONTROLLERS ONLY</p> <p>The Controller Assembly shall be provided with permanent mount Rain Master™ ProMax™ Receiver Kit for the purpose of remote valve operation for Rain Bird® LXME, LXMEF, or LX D Controllers. Up to 999 #RMRX-RBLX receivers may be controlled by a single transmitter and operates at a frequency of 154.600 MHz. The #RMRX-RBLX Kit includes the receiver, Rain Bird® remote adapter board, Chassis Mount Access, and receiver antenna.</p>
RB-URA	<p>9 PIN REMOTE CONTROL ADAPTER BOARD – FOR RAIN BIRD LX SERIES CONTROLLERS ONLY</p> <p>The Controller Assembly shall be provided with a 9 Pin remote control adapter connector board for the purpose of activating irrigation valves remotely with a Rain Master™ ProMax™ remote control and Rain Bird® LXME, LXMEF, or LX D Controller. The remote control adapter board shall provide access of activating up to 200 stations..</p>
RECX	<p>TRC REMOTE RECEIVER & TRANSMITTER KIT</p> <p>The Controller Assembly shall be provided with a TRC Radio Remote Transmitter and Receiver Kit for the purpose of activating irrigation valves remotely for a distance of approximately one mile from the controller location that is to be activated. The receiver shall have up to 32 outputs and a master valve output and is adaptable to any controller using 24 VAC and Remote Ready Connector (RRC). The Receiver and Transmitter Kit include antennas and carrying case.</p>
RCX	<p>TRC REMOTE TRANSMITTER KIT ONLY</p> <p>The Controller Assembly shall be provided with a TRC Radio Remote Transmitter-only kit for the purpose of activating irrigation valves remotely for a distance of approximately one mile from the controller location that is to be activated. One transmitter shall be capable of communicating up to 199 receiver group cards (#RC). Receiver Cards must be installed in each Controller Assembly that transmitter is to activate.</p>

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Coach's Switch Assembly

PART#	DESCRIPTION
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COACH'S SWITCH ASSEMBLY (8" Color Touch Screen)

The Controller Assembly shall be provided with a TS2 Coach's Switch Assembly for the purpose of manual valve sequencing for applications such as synthetic turf cool-down and dust control. The Coach's Switch Assembly consists of a control module, valve sequencer, push button activation and on/off switch, output board, and relay. Each module is independently programmable from 1 -999 minutes and is pre-mounted in a controller assembly or separate enclosure. For multiple module assemblies, the user may activate any sequence required such as modules 1, 3, 6, and 7. In this example, only modules 1, 3, 6, and 7 would irrigate in succession. Each module is capable of activating up to 3 valves simultaneously. The valves that may be activated by the Coach's Switch module may also be controlled by a separate irrigation controller. The number of modules may vary from 1-10 and each module may be capable of activating up to three valves simultaneously.

TS2-X:X

Part Number Examples: For 1 module activating 1 valve, use #TS2-1:1, for 2 modules with each activating 1 valve, use # TS2-2:1.

PART#	Module/Valves	Part #	Modules/Valves	Part #	Module/Valves
TS2-1:1	1 Module/1 Valve	TS2-1:2	1 Module/2 Valves	TS2-1:3	1 Module/3 Valves
TS2-2:1	2 Modules/1 Valve	TS2-2:2	2 Modules/2 Valves	TS2-2:3	2 Modules/3 Valves
TS2-3:1	3 Modules/1 Valve	TS2-3:2	3 Modules/2 Valves	TS2-3:3	3 Modules/3 Valves
TS2-4:1	4 Modules/1 Valve	TS2-4:2	4 Modules/2 Valves	TS2-4:3	4 Modules/3 Valves
TS2-5:1	5 Modules/1 Valve	TS2-5:2	5 Modules/2 Valves	TS2-5:3	5 Modules/3 Valves
TS2-6:1	6 Modules/1 Valve	TS2-6:2	6 Modules/2 Valves	TS2-6:3	6 Modules/3 Valves
TS2-7:1	7 Modules/1 Valve	TS2-7:2	7 Modules/2 Valves	TS2-7:3	7 Modules/3 Valves
TS2-8:1	8 Modules/1 Valve	TS2-8:2	8 Modules/2 Valves	TS2-8:3	8 Modules/3 Valves
TS2-9:1	9 Modules/1 Valve	TS2-9:2	9 Modules/2 Valves	TS2-9:3	9 Modules/3 Valves
TS2-10:1	10 Modules/1 Valve	TS2-10:2	10 Modules/2 Valves	TS2-10:3	10 Modules/3 Valves

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Solar Assemblies

PART#	DESCRIPTION
SLR1/SLR1-XP	<p>SOLAR ASSEMBLY W/ 1 PANEL + 108 AMP/HR BATTERY (1-12 Station Controller)</p> <p>The Controller Assembly shall be provided with a Solar Panel assembly for the purpose of providing standard 110 VAC power (135 Watts) to the controller. This assembly shall be a 135 Watt System with one solar panel, one 108 amp/hr battery, a digital voltage meter, 25 amp system controller and modified 125 watt sine inverter. The solar panels shall be mounted on a customer provided pole or may be building mounted. The SLR1-XP includes a pole for mounting (to be selected).</p>
SLR2/SLR2-XP	<p>SOLAR ASSEMBLY W/ 2 PANELS + 255 AMP/HR BATTERY (13-48 Station Controller)</p> <p>The Controller Assembly shall be provided with a Solar Panel assembly for the purpose of providing standard 110 VAC power (270 Watts) to the controller. This assembly shall be a 270 Watt System with two solar panels, one 255 amp/hr battery, a digital voltage meter, 25 amp system controller and modified 125 watt sine inverter. The solar panels shall be mounted on a customer provided pole or may be building mounted. The SLR2-XP includes a pole for mounting (to be selected).</p>
SLR3/SLR3-XP	<p>SOLAR ASSEMBLY W/ 3 PANELS + 255 AMP/HR BATTERY (49-84 Station Controllers)</p> <p>The Controller Assembly shall be provided with a Solar Panel assembly for the purpose of providing standard 110 VAC power to the controller. This assembly shall be a 400 Watt system with three solar panels, one 255 amp/hr battery pack, a digital voltage meter, 45 amp system controller and modified 225 watt sine inverter. The solar panels shall be mounted on a customer provided pole or may be building mounted. The SLR3-XP includes a pole for mounting (to be selected).</p>
SLR4/SLR4-XP	<p>SOLAR ASSEMBLY W/ 4 PANELS + 255 AMP/HR BATTERY (85-120 Station Controllers)</p> <p>The Controller Assembly shall be provided with a Solar Panel assembly for the purpose of providing standard 110 VAC power to the controller. This assembly shall be a 520 Watt System with four solar panels, one 255 amp/hr battery pack, a digital voltage meter, 45 amp system controller and modified 225 watt sine inverter. The solar panels shall be mounted on a customer provided pole or may be building mounted. The SLR4-XP includes a pole for mounting (to be selected).</p>

Data Collection

PART#	DESCRIPTION
DAT-XX	<p>DATA COLLECTION – XX STATION (# of STATIONS TO BE NOTED)</p> <p>The Controller Assembly shall include a DAT-XX for the purpose of Data Collection for a XX station Controller. This data collection is for the purpose of inputting collected field data such as station locations and types, flow data, and precipitation rates (per manufacturers catalog), into a computer database and software for creating irrigation schedules. XX refers to the number of stations on the controller to collect data on.</p>

Controller Assembly Options (continued)

Specifications For Pre-Installed Controller Assembly Options

(May be used with all controller types except where noted)

Solar Assemblies

PART#	DESCRIPTION
MP16	<p>MOUNTING PAD – 16” TOP ENTRY ENCLOSURE</p> <p>The Satellite/Controller Assembly shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting a 16” wide top entry enclosure. This assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad, and 304 grade stainless steel fastening brackets. The support base shall be installed and compacted in earth allowing the top two inches of the support base to be exposed above the grade.</p>
	<p>MOUNTING PAD – 18” WIDE FRONT ENTRY ENCLOSURE</p> <p>The Satellite/Controller Assembly shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting an 18” wide front entry enclosure. This assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad, and 304 grade stainless steel fastening brackets. The support base shall be installed and compacted in earth allowing the top two inches of the support base to be exposed above the grade.</p>
MP18D	<p>MOUNTING PAD – 18” DOUBLE-WIDE FRONT ENTRY ENCLOSURE</p> <p>The Satellite/Controller Assembly shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting an 18” double-wide back-to-back entry enclosure. This assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad and 304 grade stainless steel fastening brackets. The support base shall be installed and compacted in earth allowing the top two inches of the support base to be exposed above the grade.</p>
	<p>MOUNTING PAD – 22” TOP ENTRY ENCLOSURE</p> <p>The Satellite/Controller Assembly shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting a 22” wide top entry enclosure. This assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad, and 304 grade stainless steel fastening brackets. The support base shall be installed and compacted in earth allowing the top two inches of the support base to be exposed above the grade.</p>
MP24	<p>MOUNTING PAD – 24” WIDE FRONT ENTRY ENCLOSURE</p> <p>The Satellite/Controller Assembly shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting a 24” wide front entry enclosure. This assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad and 304 grade stainless steel fastening brackets. The support base shall be installed and compacted in earth allowing the top two inches of the support base to be exposed above the grade.</p>
	<p>MOUNTING PAD – 24” DOUBLE-WIDE FRONT ENTRY ENCLOSURE</p> <p>The Satellite/Controller Assembly shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting a 24” double wide back-to-back entry enclosure. This assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad and 304 grade stainless steel fastening brackets. The support base shall be installed and compacted in earth allowing the top two inches of the support base to be exposed above the grade.</p>
MP-MT	<p>MOUNTING PAD – 28” WIDE METER + CONTROLLER ENCLOSURE</p> <p>The Satellite/Controller Assembly shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting a 28” electrical meter/controller enclosure. This assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad and 304 grade stainless steel fastening brackets. The support base shall be installed and compacted in earth allowing the top two inches of the support base to be exposed above the grade.</p>
	<p>MOUNTING PAD – 18” WIDE METER ENCLOSURE ONLY</p> <p>The Electrical Meter shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting an 18” electrical meter enclosure. This mounting assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad and 304 grade stainless steel fastening brackets.</p>
MP-M	<p>MOUNTING PAD – 18” WIDE METER ENCLOSURE ONLY</p> <p>The Electrical Meter shall be provided with an Enclosure Mounting Pad assembly for the purpose of mounting an 18” electrical meter enclosure. This mounting assembly consists of a reinforced plastic support base, a three-sixteenth inch thick 5052 H32 Marine Grade Aluminum mounting pad and 304 grade stainless steel fastening brackets.</p>

CONTROLLER ASSEMBLIES

BASELINE™ BASE STATION 1000 CONTROLLER ASSEMBLY

The Imperial Controller Assembly (ICA) is built with the highest quality standards using UL Listed stainless steel enclosures to provide simple and efficient installations in the field. All Assemblies include a pre-installed controller(s), 120VAC receptacles, terminal boards for wiring and mounting instructions. The Imperial Assemblies wiring harness is wired through the rear giving it a clean look. As pre-assembled and pre-wired for convenience, the installer is responsible for setting the enclosure base (or Mounting Pad), installing conduits, wiring the 120VAC electrical to the receptacle, and connecting the valve wires to the terminal board. Optional flow, rain, and other sensing devices may also be connected to the terminal board.

Mounting bases (#MP) are ideal way to further reduce installation time by eliminating the need to a pour concrete base. All Imperial Assemblies include a limited 5 year warranty.

SPECIFICATIONS

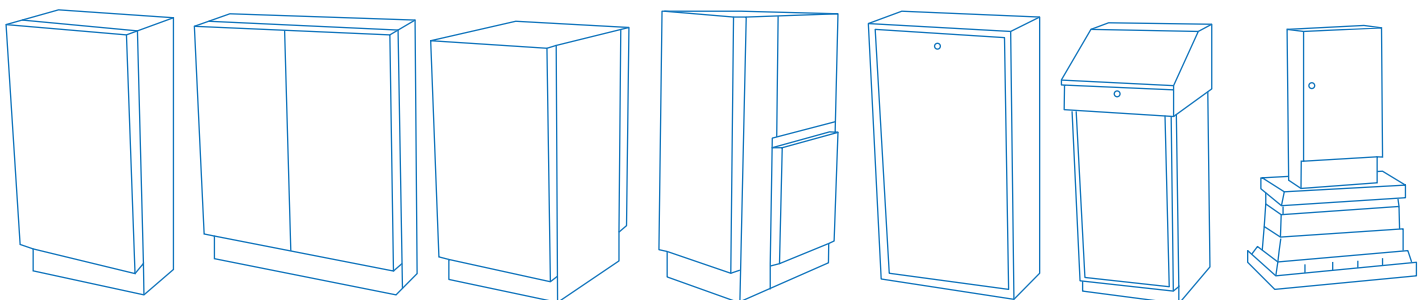
The Imperial Controller Assembly shall include a UL Listed stainless steel vandal resistant enclosure with a removable backboard, 120VAC outlet receptacle, and terminal wire board with Remote Receiver Connector (RRC).

The electrical junction box shall include an on/off power switch and duplex receptacle with ground fault interrupt circuit.

The terminal wiring board shall be pre-mounted and wired through the rear side of the backboard and shall include screw-less cage-type terminal block connections including up to two slots per terminal and may accept 12 or 14 gauge AWG wires. The terminal board shall also include a reset-able fuse and sensor bypass switch.

The terminal board(s) shall have a maximum of forty eight (48) valve station locations including additional terminals for up to four (4) common wires, master valve(s), two (2) rain sensor terminals, pump start, flow sensor, and two-wire communication cables.

CABINET OPTIONS



- SINGLE CABINET
- SIDE BY SIDE
- DOUBLE WIDE
- METER CONTROLLER
- LITE CONTROLLER
- TOP ENTRY
- MOUNTING PAD

CONTROLLER ASSEMBLIES

TORO® DXi™ SATELLITE ASSEMBLY PART NUMBERING GUIDE

Imperial Satellite Assembly Part Number

ISAX-T01-XX+XX/Options

ISAX- Specify Strong Box Stainless Steel Enclosure Type

FRONT ENTRY	BOX DIMENSIONS	CODE/MODELS (Stations ranges available)		
BaseLine	BL	1 = BL1000 (12-100) 2 = BL3200 (12-200)	3 = BL3200SS (SubStation) 4 = BL1000FS (FlowStation)	Note: #1 and 2 are conventional & two wire.
Calsense	CS	1 = Omitted	2 = ET3000 (8-48)	3 = ET3000 (128 decoder)
ET Water	HU	1 = ICC2 (8-54) 2 = ACC2 (12-54) 3 = ACC (12-42) 4 = ACC2 (225 decoder)	5 = ACC-99D (99 decoder) 6 = ICore-M (6-42) 7 = ICore-PI (6-30) 8 = Dual-M (6-48)	9 = Dual-PI (6-48) 10 = Pro-HC (6-24) 11 = HC (6-36) 12 = HCC (8-54)
Hydro-Point	HP	1 = Omitted 2 = Omitted 3 = WTPRO3 (12-48, 72, 96)	4 = WTLC w/flow (6-18) 5 = WTLC no flow (6-18)	6 = WTPRO3 (48 & 96 2 wire decoder interface)
Irri-trol	IR	1 = MCE (6-48)	2 = TC (6-24)	3 = IBOC (4-12)
Rain Bird <small>(For MAXICOM, See Section in Binder)</small>	RB	1 = Omitted 2 = ESP-LXME (8-48) 3 = ESP-LXMEF (8-48)	4 = Omitted 5 = ESPLXD (200 decoder) 6 = ESP-LX Basic (12-48)	7 = ESP-ME3 (4-22) 8 = LX IVM & IVM PRO (60 or 240 decoder)
Rain Master	RM	1 = SENTAR (6-36) 2 = EAGLE (6-36) 3 = EAGLE-T (6-36) 4 = EAGLE-I (6-36)	5 = EAGLE+ Ethernet (6-48, 200 Dec) 6 = EAGLE+ Cellular (6-48, 200 Dec)	Note: The RM5 is Ethernet only; RM6 is Cellular only – both include 5 yr. data plans
Toro	TO	1 = CCM (9-48) 2 = Omitted	3 = TMC (2-12) 4 = TMC-E (4-24) w/flow	5 = TDC (100/200 decoder) 6 = EVO (4-16)
SENTINEL CENTRAL: ISA-TOX-XX Assy. Designation				
Toro	TO	1 = CONTROL MODULE – Hardwire (12-48) 2 = CONTROL MODULE – Wireless (48) 3 = SC (9-18)	4 = WIRELESS OUTPUT BOARD (12-48) 5 = TWO WIRE (204 DC Latching)	
Tucor	TU	1 = RKD (100 decoder) 2 = RKS (1-100)	3 = TWC (200 decoder) 4 = LTD (50 decoder)	5 = TWI (200 decoder)
Weathermatic	WM	1 = Smart Line (12-48) 2 = Smart Line w/Air Card (12-48) 3 = Smart Line w/ Air Card + flow (12-48) 4 = Omitted	5 = Smart Line Decoder (16-96) 6 = Smart Line Decoder w/ Air Card (16-96) 7 = Smart Line Decoder w/ Air Card + flow (16-96)	