

TORO

SENTINEL® CENTRAL CONTROL



Leveraging cutting-edge wireless communication and sensing technologies, Toro's line of Sentinel® central control products offers maximum flexibility and control in an easy-to-use package for sites both large and small.



Powerful, Reliable & Versatile



Model	Conventional Output Boards	Wireless Output Boards	DC Two-Wire	AC Two-Wire	No Keypad Option	Maximum Stations	Dimensions	Warranty
WS1 Small Powder-Coated Wall-Mount Enclosure	X	X		X	X	48 Conventional or Wireless; 204 two-wire	10 1/4" W x 15 1/4" H x 5 1/4" D	Five years
WS5 Large Stainless Steel Wall-Mount Enclosure	X	X	X	X		48 Conventional or Wireless; 204 two-wire	17 1/8" W x 30 3/4" H x 8 5/8" D	Five years
PS1 Stainless Steel Pedestal	X	X	X	X		48 Conventional or Wireless; 204 two-wire	17 1/8" W x 34 1/2" H x 8 5/8" D	Five years
PP1 Plastic Pedestal	X	X	X	X		48 Conventional; 96 wireless; 204 two-wire	17" W x 40" H x 16" D	Five years
WS3 Small Stainless Steel Wall-Mount Enclosure	X				X	18 Conventional	10 3/4" W x 9 3/4" H x 3 1/2" D	Five years
WS2 Medium Powder-Coated Wall-Mount Enclosure			X			204 two-wire	14" W x 13" H x 6" D	Five years

TORO**SENTINEL® CENTRAL CONTROL****WATER
SMART**

Sentinel Central Control from Toro® is a powerful system that literally “stands guard” over irrigation sites. With the ability to control up to 999 field satellites from one location, users have a water management tool that provides ultimate customizability and reliability.

FEATURES & BENEFITS

Simple To Use

Microsoft® Windows-based software – daily operations and scheduling are made quick and easy.

Features For Water Management

ET-based watering, flow sensing and optimization, water usage report with historical comparison maximize system efficiency.

Smartphone and Tablet Connectivity

The new Sentinel WMS software package also includes iPhone® and iPad® connectivity for remote programming and alerts on ALL new systems.

Multiple Communication Options

Communication options like radio, Wi-Fi, cellular, and Ethernet can be mixed and matched to meet system requirements.

Distributed Programming

Stores irrigation programs in the computer while allowing irrigation control at the satellite level, ensuring the loss of a component does not result in the loss of irrigation across the system.

Toro NSN® Support

All centrals come with a minimum of two years of NSN support – unlimited 24-hour toll-free support with 24/7/365 emergency paging.



iPhone® and iPad® Connectivity



Remote
Ready

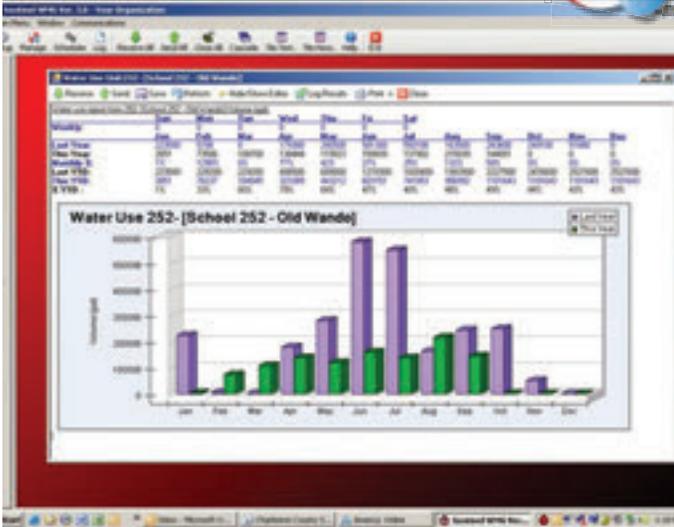


Soil
Sensing
Option



ET Adjust

WATER MANAGEMENT HIGHLIGHTS



Water Savings – ET-based (multiple weather station options)
 Effective ET-based system management can lead to water savings of 25% to 30% per year. As an additional source of savings, pipeline breaks, malfunctioning valves, and missing heads are automatically detected and shut down, preventing excessive water loss.



Distributed Intelligence
 Each Sentinel® controller is a fully intelligent unit with program data stored at both the field satellite and within the central computer. In the event a computer or master controller goes off line, there will be no loss of irrigation. True two-way communication allows programming changes to occur at the on-site field controller and uploaded to the central computer. Protection from unauthorized changes is ensured as the controller program can be easily compared to the program saved in the central computer.

SPECIFICATIONS

Electrical

- Control up to 999 field satellites
- Group controllers into “systems” for system-wide adjustments:
 - Rain Days
 - Percent Adjust
 - ET-Adjustment from shared weather source
- Field changes to controller programs can be uploaded to computer
- Support for the System Administration
 - Set system, program and satellite descriptions
 - Map valve positions on site maps
 - Mark special dates on on-screen calendar
- Alarm reporting of any system component failure, including communications, over/under-flow conditions, electrical problems or power failure
- Extensive reporting features:
 - Run time reports
 - Water usage
 - Alarms
 - Logging of system changes

Warranty

- Two year extendable by continuous NSN subscription

Additional Features

- ✓ Flow optimizing to maintain optimum flow and shorten water window
- ✓ Ability to redefine valve sequence without physically changing wire terminations in field satellite
- ✓ Information overview by group and satellite
- ✓ System status indications for individual field satellite
- ✓ On-line help screens
- ✓ Map-based feedback on system status
- ✓ Standard internet connection allows for remote access to central software via NSN® Connect

SENTINEL CENTRAL MODEL LIST

Model	Description
CENTRAL SOFTWARE/COMPUTER MODELS	
SGIS-1-T	Software Only with 2 years of NSN Support
SGIS-0-1	Software, Peripheral Hardware with 2 years of NSN Support
SGIS-1-0	Software, Computer Equip, Peripheral Hardware with 2 years of NSN Support
NSN SUPPORT EXTENSION MODELS	
SSE-T-1	1 year Extension for SGIS-0-1 of SGIS-1-T
SSE-T-3	3 year Extension for SGIS-0-1 of SGIS-1-T
SSE-C-1	1 year Extension for SGIS-1-0 (with computer warranty)
SSE-C-3	3 year Extension for SGIS-1-0 (with computer warranty)

Specifying Information—Sentinel Central Control

Description	Optional
SGIS	-X-X
SGIS—Sentinel Central Control Irrigation System	1-T—Software Only with 2 Years of NSN Telephone Support for Software 0-1—Software, Peripheral Hardware with 2 Years of NSN Telephone Support 1-0—Software, Computer Equipment, Peripheral Hardware with 2 Years of NSN Telephone Support (with computer warranty)

TORO®**SENTINEL® CONTROLLERS****WATER
SMART™**

Toro® Sentinel field satellites are commercial grade, modular units that do the irrigation control work in the field designed to operate in both stand-alone and central mode.

FEATURES & BENEFITS

Flow Sensing

Reads, displays and reacts to under and over flow situations and tracks water usage. No additional circuit boards are required.

Expanded Wireless Connectivity

Sentinel offers true two-way communication via several different connectivity options that can be mixed and matched to meet system requirements.

Firmware Updating

Firmware is now easier than ever to update or upgrade by simply inserting a USB thumb drive.

Weather-Based Irrigation

Sentinel waters according to ET values by using one or a number of onsite weather stations.

Advanced Troubleshooting

The new satellite controller has significantly more internal memory, allowing for extensive event logging and data storage, making it easier to diagnose issues in the field.



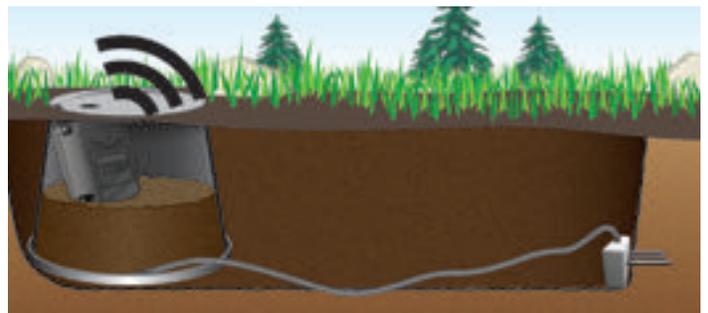
The newly-redesigned satellite controller offers a number of new features and enhancements, including a completely-redesigned interface for easier standalone programming that incorporates a large backlit graphical display, new shortcut buttons for frequently-used functions, as well as a number of other additions.

WATER MANAGEMENT HIGHLIGHT



Pro Series™ Soil Sensor

The new satellite controller can easily be upgraded to operate with the new Toro Pro Series™ Soil Sensor, communicating directly with up to 16 sensors per controller (1 per program), continually measuring moisture levels in the soil, and adjusting irrigation as needed. See page 89 for more details.

Remote
ReadyFlow
Sensor
CompatibleSoil
Sensing
Option

CABINET CHOICES



WS1
Powder-coated, wall-mount enclosure



WS5 Stainless Steel Wall Mount
16-gauge stainless steel, front-entry, wall-mount enclosure with backplate and junction box



PP1 Plastic Pedestal
Double-sided, plastic, top-entry pedestal-mount enclosure with dual backplates and junction box



PS1 Stainless Steel Pedestal
16-gauge stainless steel, top-entry, pedestal-mount enclosure with backplate and junction box

SPECIFICATIONS

Operational

- 16 programs
- Eight start times per program
- 6-week scheduling calendar
- Station runtimes from one minute to 4 hours and 15 minutes
- Global adjustment from 0-255%
- Handheld remote ready
- ET and Soil Sensing options
- Two sensor inputs included for rain sensors or other switch sensors
- Operating temperature: 14° to 140°F
- Two flow sensor inputs
- Lower cost "faceless" controller option without faceplate (handheld and central programming only)

Dimensions

- Small wall-mount: 10¹/₄" W x 15¹/₄" H x 5¹/₄" D
- Stainless steel wall-mount: 17¹/₈" W x 30³/₄" H x 8⁵/₈" D
- Stainless steel pedestal-mount: 17¹/₈" W x 34¹/₂" H x 8⁵/₈" D
- Plastic Pedestal-mount: 17" W x 40" H x 16" D
- Weight:
 - Small Metal Wall-mount: 21 lbs
 - Stainless steel wall-mount: 47 lbs
 - Stainless steel pedestal-mount: 64 lbs
 - Plastic Pedestal: 60 lbs

Electrical

- Input power:
 - 120 VAC, 60 Hz
- Station output power:
 - 24 VAC
 - 1.0 amps per station maximum
 - 2.0 amps total load
- Surge protection: 24 V output boards, 20 KV @ 10 KVA

Optional Accessories

- TRS – Wired RainSensor
- TWRS/TWRFS – Wireless RainSensor or Wireless Rain/Freeze Sensor
- TFS Flow Sensors
- SHHR – Handheld Remote
- TPS-RX – Toro Pro Series™ Soil Sensor Receiver
- TPS-SS – Toro Pro Series Soil Sensor

Warranty

- Five years

Additional Features

- ✓ Upgrade to a central computer system without additional field satellite hardware or costs
- ✓ Program single or multiple stations to operate sequentially or start a program or multiple programs with just a few keystrokes
- ✓ Ability to read open- or closed-contact switches in any station count configuration
- ✓ Current monitor will disable a station if excessive amp draw is detected
- ✓ Non-volatile memory will retain all programming and real-time data for ten years
- ✓ Multi-language display: English, Spanish, French, and Italian

Specifying Information—Sentinel

SB-X-XX-XXX-U			
<i>Configuration</i>	<i>Station Count</i>	<i>Enclosure</i>	<i>Communication</i>
SB-X	XX	XXX	U
SB—Conventional Wired SBW—Short-range Wireless SBN—No Keypad (WS1 Conventional)	12—12-station 24—24-station 36—36-station 48—48-station	WS1—Powder-coated Wall Mount (Small) WS5—Stainless Steel Wall Mount (Large) PP1— Plastic Pedestal Mount (Large) PS1— Stainless Steel Pedestal Mount (Large)	U—UHF radio
Example: A 24-station Sentinel conventional controller in a small powder-coated wall-mount enclosure with UHF communication would be specified as: SB24WS1U			

TORO

SENTINEL® WIRELESS OUTPUT BOARDS



SPECIFICATIONS

Operational

- Wireless Output Controllers (SBW models) are expandable from 12 to 96-stations
- Ability to mount outputs remote from Sentinel® Control Module
 - No cabling between output boards and control module improves protection of control module from power surges
- Improved sensing includes real-time current draw per station
- Manual station activation switches
- High surge protection

Options

- Multiple Enclosure Options

Warranty

- Five years

Sentinel Wireless Output Boards utilize spread spectrum radio communication between the control module and the output boards, allowing nearly unlimited installation flexibility while virtually eliminating surge damage to the control module. Retrofits and remote flow sensing are a snap as hardscape crossing issues are eliminated.

TORO

SENTINEL® CUSTOM CONTROL SERIES



Remote
Ready



Flow
Sensor
Compatible

Sentinel Custom Control satellites are built to fit your needs and to avoid overkill on small sites. These satellites ship without manual interface keypad or display, minimizing expense without sacrificing capabilities. All the features expected of a Sentinel controller, but cost-effective for your small site needs.

SPECIFICATIONS

Operational

- All the capabilities of a Sentinel Controller, including 16 programs and eight start times per program
- 9, 12, and 18 station models
- 6-week scheduling calendar
- Station runtimes from one minute to four hours and 15 minutes
- Global adjustment from 0-255%
- Percent adjust by program from 0-255%
- Two sensor inputs included for rain sensors or other switch sensors
- Flow Monitoring Only units available (no stations) for water supply flow monitoring
- Lower cost "faceless" controller option without keypad (handheld and central programming only)

Warranty

- Five years

Specifying Information—Sentinel® Custom Control Series

SCX-XX-WS3-U			
Configuration	Station Count	Enclosure	Enclosure
SBD	XX	WS3	U
SC – Conventional SCN – No Keypad	9—9-station 12—12-station 18— 18-station	WS3 Small Station Stainless Wall-mount	U – UHF Radio



Easy to install and expand – a highly cost-effective field controller for large central control installations. Using a two-wire path to communicate to decoders, the Sentinel Two-Wire controller eliminates high costs associated with traditional valve wiring.



Remote Ready



Flow Sensor Compatible



Soil Sensing Option

AC SENTINEL TWO-WIRE STATION DECODERS*

Model	Description
SB-DAC-1	1-station AC decoder
SB-DAC-2	2-station AC decoder
SB-DAC-4	4-station AC decoder
SB-BLA	AC in-line surge protection

*Decoders only compatible with new "SBA" Sentinel controller models.

DC SENTINEL TWO-WIRE STATION DECODERS

Model	Description
SB-DDC-1	1-station with integrated surge protection (Operates up to two DC)
SB-DDC-2	2-station with integrated surge protection (Operates up to four DC)
SB-DDC-4	4-station with integrated surge protection (Operates up to eight DC)
SB-TWD-ISP	Sentinel two wire DC inline surge protection

SPECIFICATIONS

Operational

- Up to 204 stations
- Operates Valves with DC-Latching Solenoids
- 16 programs, eight start times per program
- 6-week or 365-day scheduling calendar
- Station runtimes from one minute to 4 hours and 15 minutes
- Global adjustment from 0-255%
- Handheld remote ready
- Two sensor inputs included for rain sensors or other switch sensors
- Multi-language display: English, Spanish, French and Italian
- Operating Temperature: 14° to 140° F

Electrical (AC Models)

- Input power:
 - 120 VAC (60 Hz)
- Output power:
 - Up to 2 standard solenoids per station
 - Up to 4 standard solenoids per decoder
 - Up to 8 simultaneous standard solenoids per system
- Two-wire path wiring (jacketed, twisted pair):
 - 14 AWG: 5,000 ft max, 10,000 looped
 - 12 AWG: to 8,000 ft max, 16,000 looped
- Decoder-to-solenoid wiring:
 - 14 AWG: 150 ft max

Electrical (DC Models)

- Input power:
 - 120 VAC or 220/240 VAC (50/60 Hz)
- Output power:
 - Up to 2 DC solenoids per station
 - Up to 16 simultaneous DC solenoids
- Two-wire path wiring (jacketed, twisted pair):
 - 14 AWG: 15,000 ft max
 - 16 AWG to 8,450 ft max
- Decoder-to-solenoid wiring:
 - 14 AWG: 400 ft max

Dimensions

- Small wall-mount: 14" W x 13" H x 6" D
- Stainless steel wall-mount: 17 1/8" W x 30 3/4" H x 8 5/8" D
- Stainless steel pedestal-mount: 17 1/8" W x 34 1/2" H x 8 5/8" D
- Plastic pedestal-mount: 17" W x 40" H x 16" D
- Weight:
 - Small metal wall-mount: 21 lbs
 - Stainless steel wall-mount: 47 lbs
 - Stainless steel pedestal-mount: 64 lbs
 - Plastic Pedestal: 60 lbs

Optional Accessories

- TRS – Wired RainSensor
- TWRS/TWRFS – Wireless RainSensor or Wireless Rain/Freeze Sensor
- TFS – Flow Sensors
- SHHR – Handheld Remote
- TPS-RX – Toro Pro Series™ Soil Sensor Receiver Base Station Module for Sentinel Satellite Connectivity
- TPS-SS – Toro Pro Series Soil Sensor

Warranty

- Five years

Specifying Information-Sentinel 2-Wire Controller

SBX-XXX-U		
Configuration	Station Count	Enclosure
SBX	XXX	U
SBA – Sentinel AC Decoder Controller	WS1—Powder-coated Wall-mount (Medium) AC Only WS2—Powder-coated Wall-mount (Medium) DC Only WS5—Stainless Steel Wall-mount (Large)	U – UHF Radio
SBD – Sentinel DC Decoder (two-wire) Controller	PP1—Plastic Pedestal-mount (Large) PS1—Stainless Steel Pedestal-mount (Large)	

Example: A Sentinel DC two-wire controller in a medium powder-coated wall-mount enclosure with UHF communication would be specified as: **SBDWS2PU**

Refer to page 99 for enclosure compatibility.



Maximize efficiency on your Sentinel system by using ET-Based watering. ET-Based watering automatically schedules irrigation based on individual landscape needs and local weather conditions. The result is higher property values, lower water bills and a healthier environment. Unlike competitive systems, Sentinel works in conjunction with multiple weather sources including on-site weather stations and Toro’s wireless, web-based Precision™ ET.

FEATURES & BENEFITS

Precision™ ET

Precision™ ET is a web-based ET source that users subscribe to through the Toro National Support Network. Virtual Weather Stations are assigned based on latitude and longitude coordinates. Each “location” will require a yearly fee, however, unlimited controllers may be assigned to any latitude and longitude.

On-Site Weather Stations*

Choose from a number of manufacturer’s weather stations to meet your customer’s needs. Choose wired or wireless versions to best suit the installation method needed.

*CIMIS (CA Only)
Freely access a network of over 120 automated weather stations in the State of California managed by the California Department of Water Resources (DWR).

SPECIFICATIONS

Recommendation On-Site Weather Station

- Davis Vantage Pro 2 Plus™
 - Cabled (6162C)
- Less Expensive
- 100’ feet of cable provided
- 1000’ possible
 - Wireless (6162)
- No cable necessary
- Repeaters can be used
 - Wireless Repeaters (7654)
- AC powered
- Solar
- Used with 6162 Davis Station
- WeatherLink® Software (6510 SER)

Supported Weather Sources:

- Precision™ ET (Virtual)
- CIMIS (Free CA only)
- Davis Instruments®
 - Vantage Pro 2 Plus™
 - Grow Weather™
- Campbell Scientific®
 - ET 106
 - Turf Weather
- Irrisoft™
 - Weather Reach™

SENTINEL SMART IRRIGATION MODEL LIST

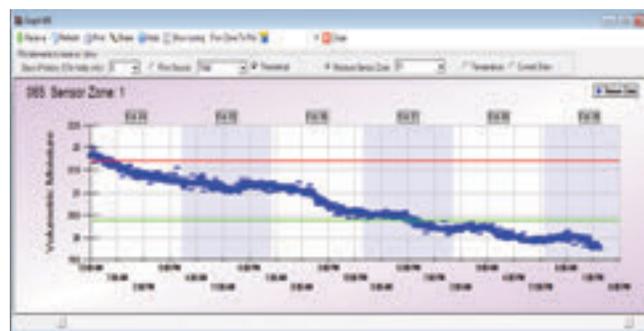
Model	Description
T-PREC-ET	Precision™ ET Renewal

On-site weather stations ordered separately.



SPECIFICATIONS

- 1 sensor assignable per program
- 16 sensors per controller
- Sensor data read every 5 minutes
- Ability to work in conjunction with ET-based control
- Refer to page 89 for additional information on the Toro® Pro Series™ Soil Sensor.



SOIL SENSING MODEL LIST

Model	Description
TPS-RX	Toro Pro Series Receiver for Sentinel controllers
TPS-SS	Toro Pro Series soil sensor
TG-S2-R	Turf Guard soil sensor

Using either the new wireless Toro® Pro Series™ Soil Sensor or the full-featured Turf Guard® soil sensor, Sentinel users can set upper and lower moisture level “trip points” in the software to regulate when irrigation is allowed, as well as view the trends over time on an at-a-glance dashboard.



SPECIFICATIONS

- Two flow inputs standard on all Sentinel controllers
- High, low, and zero flow detection by station or group of stations
- Unexpected flow detection outside of scheduled watering
- Volumetric flow shutdown option
- Projected and actual flow graphing
- Data exportable to customized Excel spreadsheets
- Each controller stores two years of flow data

FLOW SENSING MODEL LIST

Model	Description
TFS-100	1" sensor (5–50 gpm)
TFS-150	1.5" sensor (5–100 gpm)
TFS-200	2" sensor (10–200 gpm)
TFS-300	3" sensor (20–300 gpm)
TFS-400	4" sensor (40–500 gpm)

Toro Sentinel satellites have extensive flow reading, reaction, and reporting capabilities. All controllers come standard with two flow inputs and two alarm inputs, and are compatible with both standard flow sensors as well as most hydrometers, including reed-switch and 3-wire pulse-diode models.



SPECIFICATIONS

Operational

- Simple command set
- Accesses controller and satellite features from the field
- Direct access to controllers (central control software not required)
- Two-way voice communication capability
- System On and Off command activation
- Five-watt radio
- 120 selectable and programmable channels
- Range: up to 2 to 3 miles

Dimensions

- Transmitter size (with antenna):
2³/₈" W x 1³/₄" D x 11" H

Warranty

- Two years

The Sentinel® remote allows users to conduct irrigation checks, and fully operate the system without opening a field satellite enclosure or needing a second person. This remote also serves as a two-way voice radio, allowing easy communication with other crew members.

SENTINEL HANDHELD REMOTE MODEL LIST

Model	Description
SHHR	Sentinel Handheld Remote



SPECIFICATIONS

Operational

- Flow sensor, ET gauge and rain sensor capabilities
- Non-volatile memory in case of a power outage
- 100% compatibility with the Sentinel central control software
- Optional hand-held control with a Sentinel hand-held unit
- Provides the convenience of remote manual control
- Multiple hand-helds can be used on one site

Dimensions

- 5 1/2" W x 5 1/2" L x 1 1/2" H

Accessories

- SHHR – Sentinel Handheld Remote

Warranty

- Two years

The Sentinel® Retro-Link assembly unit allows an existing Rain Bird® ESP-MC controller to be upgraded to a Sentinel field satellite. Retro-Link is 100% compatible with the Sentinel central control software.

SENTINEL RETRO LINK MODEL LIST

Model	Description
SB-RLS-U2-RB	Sentinel Retro-Link Assembly (Rain Bird ESP-MC)



SPECIFICATIONS

Support for the Sentinel® Central Control

- Every Sentinel central package comes standard with 2-years NSN support
- Unlimited 24-hour toll-free support with 24/7/365 emergency paging
- Technical assistance by email with next business day response
- Remote PC assistance where connectivity is available
- Support of Microsoft® operating system software when purchased from NSN
- NSN lab for field issue duplication and diagnostics
- Technical bulletins
- Remote data storage for duration of subscription period
- Extended warranty on central hardware components with continuous subscription
- User training both hardware and software
- For more information on products, services or training, contact:

Toro NSN
 P.O. Box 3339,
 Abilene, TX 79604
 Phone: 888-676-8676
 Website: toronsn.com

Isn't it nice to know someone's got you covered? Available day or night, you can count on the Toro National Support Network (NSN®) team for total operational confidence.

FEATURES & BENEFITS

24-Hour, Seven-Day, 365 Support

Worldwide, Toro NSN is always available to answer your questions, troubleshoot your system and solve your problems. And if needed, our 24-hour central computer and component replacement service ensures minimal disruption to the operation of your irrigation system (U.S.).

Industry-Best Training – Classroom and Internet-Based

Classroom instruction is available at regional locations and at the NSN Training Center—where classes feature hands-on computer training and the operation of Toro hardware. NSN's new internet-based Training In Ten™ features critical instruction that can be learned in ten minutes or less and quickly applied right on-the-job!

The Confidence of Working with the Best in the Business

Toro NSN is a Microsoft® Certified Partner. Our support technicians are licensed irrigators. NSN has a diagnostic lab on-site for each irrigation platform, all field hardware, plus ancillary products. The lab is used to duplicate field issues and investigate causes and solutions as part of Toro's commitment to continuous improvement. NSN is dedicated to irrigation—we know your business and expectations.

New System Support, Flexible Options to Renew

Every new Sentinel offering includes Toro NSN support. To protect your Toro investment long-term, choose a renewal option that gives you exactly what you need for continued reliable, cost-effective support and extended warranty, including equipment upgrades to keep your technology current and powerful.

Note: NSN Features vary based on the Sentinel product offering purchased. Contact Toro Sales for details.

Specifying Information—NSN/Sentinel Support Extensions

SSE-X-X	
Description	Optional
SSE	-X-X
SSE—Toro NSN Support for Sentinel Subscription Extensions*	T-1—1-year Extension for SGIS-0-1 or SGIS-1-T T-3—3-year Extension for SGIS-0-1 or SGIS-1-T C-1—1-year Extension for SGIS-1-0 (with computer warranty) C-3—3-year Extension for SGIS-1-0 (with computer warranty)

*1- and 3-year NSN extensions can be purchased up-front in conjunction with SGIS packages to provide the end-user with an additional one or three years of NSN support. For example, a customer can order the SGIS-1-0 and the SSE-C-3 which would equal five years of NSN support. These extensions are for original purchases only; existing plan renewals are still purchased through Toro NSN.

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 Specifications subject to change without notice. For more information, contact your local Toro distributor.

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