FUTURA ®
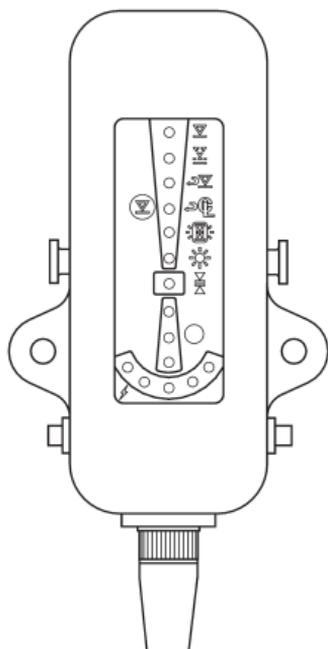
T O O L S & T E C H N O L O G Y

Operating Instructions

Remote Display Model RD15

For use with MCR Laser Receivers

Warranty

The manufacturer's receivers and remote displays are warranted to be free of defects in material and workmanship for a period of two years. Electric cables and other allied equipment are warranted for a period of ninety days.

Please return the included warranty card as this will expedite any warranty service that may be required. Please retain your warranty information and proof of purchase. If a warranty card is not on file, proof of purchase must accompany your request for warranty repair.

Any evidence of abuse, misuse, alteration, accident or negligent use or an attempt to repair products by unauthorized personnel or with parts other than those provided by the manufacturer automatically voids the warranty.

The manufacturer's liability under this warranty is limited to repairing or replacing any product returned to an authorized service center for that purpose. The foregoing states the entire liability of the manufacturer regarding the purchase and use of its product and they shall not be held responsible for any consequential loss or damage of any kind.

This warranty is in lieu of all other warranties, expressed or implied, and constitutes all of the manufacturer's liability with respect to merchandise sold by it.

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General Description

The RD15 is designed to work with MCR receivers. It is mounted in the cab of the machine for easy viewing by the machine operator. The LED's of the RD15 display grade information similar to the LED's of the receiver. Please refer to the receiver manual for specific displays and settings.

In addition to the standard grade, plumb, and tilt displays where applicable, the RD15 provides functions to set an offset elevation and a second temporary offset elevation on the receiver. An audio jack is provided for earphones. Tilt indication can be displayed for the MCR2+ and MCR3 receivers.

The RD15 power is supplied from the batteries of the receiver. Optional cables supply power from the machine battery or a machine power outlet.

Identification
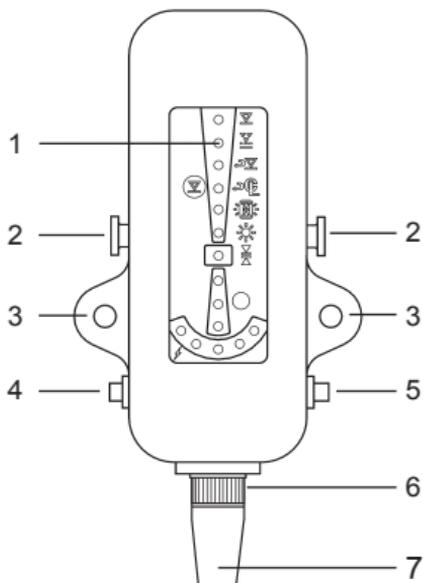
1. LED Display
2. Mounting Strap Tabs
3. Mounting Plate Tabs
4. Power / Set Function Switch
5. Select Function Switch
6. Cable Connector
7. Communication Cable
8. Mounting Plate
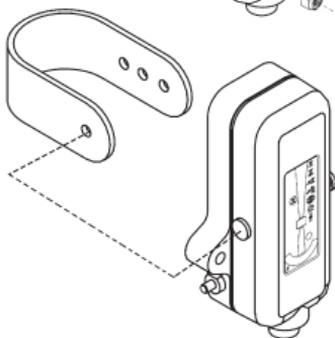9. Power Jack (3.5mm)
10. Audio Jack (2.5mm)
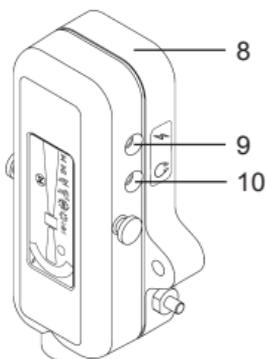
Installation

Position the RD15 in the machine's cab so the operator can easily see the LED display during machine operation. Assure it does not obstruct other operator functions. The RD15 includes an assortment of mounting hardware including magnets, double-sided tape, mating Velcro strips, and a rubber strap. Holes are provided on the mounting plate for user provided hardware if necessary. An optional swivel mount is available. Choose the appropriate mounting hardware for your particular situation to secure the display in a convenient viewing location. **NOTE:** The RD15 has a vented drain hole in the bottom of the unit near the cable connector that must face downward.

Magnet installation: Install the provided screw through the magnet and through the mounting plate tab as shown. Secure with the provided nut and tighten. Repeat for the other side.
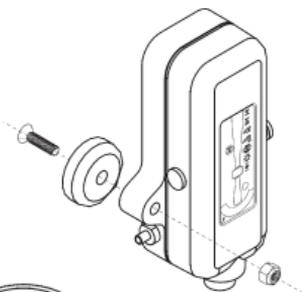
Mounting strap: Install a hole of the rubber strap around a mounting strap tab. Wrap the strap around a suitable support and secure the other end of the strap around the other strap tab. Ensure there is a snug fit.

Tape / Velcro: Double sided sticky tape and mating Velcro strips allow mounting on various surfaces of the machine. Peel off the protective backing of the adhesive side(s) and apply to the appropriate clean location on the back of the remote display and then a clean machine surface.

Optional Swivel Mount installation:

Position the swivel mount in the machine's cab so the operator can easily see the LED display during machine operation. Assure it does not obstruct other operator functions.

Determine the best mounting option for the swivel mount base. Hardware is provided if a suitable location can be found on the machine. Alternatively, the magnets supplied with the RD15 can be attached to the base of the swivel mount in the same manner they are attached to the remote display mounting plate tabs for magnetic attachment of the swivel base to the machine.
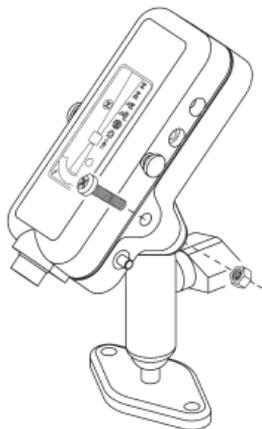
Align the RD15 mounting plate tabs and the swivel mount tabs as shown. Install the provided screw through the mounting plate and the swivel mount. Secure with the provided nut. Repeat for each side.

Cable Installation

The RD15 power is supplied from the batteries of the receiver via a receiver cable. Turn off the receiver prior to connecting the receiver cable. Optional cables can supply power from the machine battery or a machine power outlet.

A receiver cable is required to connect the RD15 and the receiver. The cable can be a straight cable or a coil cord. Extension cables are also available if additional lengths are required.

Plan the cable routing ahead of time for ease of installation. Secure all cables with tie wraps or cable clamps avoiding cable abrasion. Ensure there is excess cable at all moving joints of the machine and near the receiver and remote display for adjustment.

Cable Installation

Receiver Cable - Route the receiver cable from the RD15 to where the receiver is mounted. Turn the receiver power off prior to connecting the receiver cable. Connect the 7-socket connector to the receiver. Connect the 6-pin connector to the RD15.

Optional Power Cable, Battery - Plug the 3.5 mm barrel connector into the remote display power jack identified by the lightning bolt ($\lightning$). Route the power cable with terminal ends to the machine battery. Connect the red wire to the battery's positive (+) terminal and the black wire to the negative (-) terminal. The RD15 will operate off machine power ranging from 10 VDC to 30 VDC. Reverse voltage and over voltage protection are built in.

Optional Power Cable, Coiled Outlet Adapter - Select the 3.5 mm barrel connector. The positive (+) side aligns with the "TIP" side. Plug the connector into the remote display power jack ($\lightning$). Plug the adapter into an appropriate power outlet. The maximum extended length of the coil cable is 8 feet (2.4 m).

Earphone Jack

An earphone jack is provided for audio output and is identified by an earphone symbol ( ). User provided earphones with a standard 2.5 mm barrel connector can be used. It is recommended to use earphones that have a volume control adjustment. Fast audible signal is receiver too high. Constant signal is receiver on-grade. Slow audible signal is receiver too low.

Operation

The power on and off operation of the remote display and receiver will depend on the manufacture date and version of software in the receiver. The RD15 was released with receiver software Version 5.xx

Receivers with Version 5 software enable the power to be switched on or off at the RD15. If the receiver has older software, the power switch and some additional functions will operate differently. Refer to the chart on page 13.

Older versions of software will lock the receiver keypad, disabling keypad switches. Ensure the receiver has the desired settings selected prior to attaching the RD15.

The software version is identified by the serial number label on the circuit board located on the back top of the receiver. Receivers with Version 5.xx, released approximately September 2006, allow the power switch on the RD15 to act same as the power switch on the receiver.

Version 5 - Battery power: The power switch on the RD15 turns the receiver and remote display on and off. Press the power switch to turn on. Press and hold the power switch for 2 seconds to turn off.

Version 5 - Machine power: The receiver and RD15 turn on when the machine is turned. Press and hold the power switch for 2 seconds to turn off.

Prior Versions - Battery power: Power must be turned on and off at the receiver.

Prior Versions - Machine power: The receiver and RD15 turn on when the machine is turned on. The connector can be removed from the power jack to turn the power off.

Power ON will be indicated by any grade or tilt display LED when the receiver is in the laser beam. The on-grade LED will flash once every 4 seconds if not in a laser beam.

Operation - LED Display

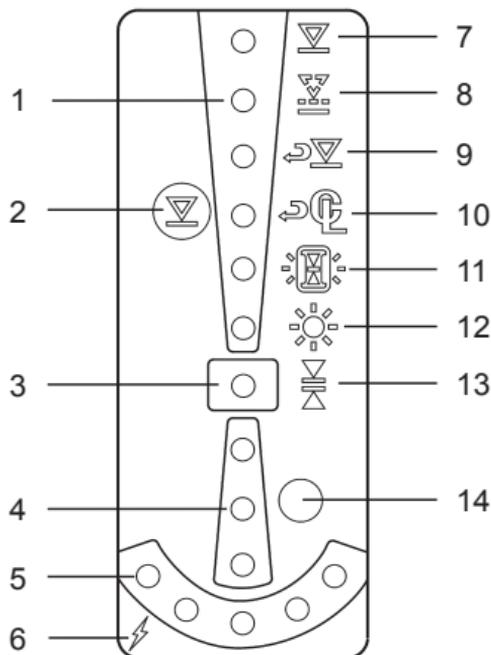1. Above grade red LED's - lower implement to get to on-grade.

2. Offset elevation function indication. Solid amber light - Offset on. Flashing amber light - Temporary Offset on.

3. On-grade green LED.

4. Below grade red LED's - raise implement to get to on-grade.

5. Five light blade tilt display for MCR3+ and MCR3. Deadband indication for all models.

6. Power switch on left side icon.

Function Indicators (7-13) - The LED will indicate what function is selected when the select function switch is pressed and cycled.

7. Set offset elevation.

8. Set temporary offset elevation.

9. Return to offset elevation.

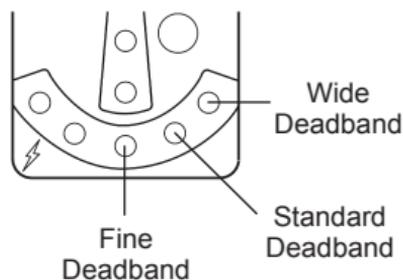10. Return to receiver default elevation.

11. Receiver LED's on or off.

12. RD15 LED brightness selection.

13. Set deadband for MCR2E.

14. Photosensor - automatically adjusts LED brightness.

Operation - LED Display

Deadband Indication

The 5 light blade tilt indication functions as a deadband (accuracy) indicator. Pressing the right side select function switch will temporarily activate a tilt display LED to show the current accuracy selection of the receiver. The deadband indication LED will always blink.

Note: If a set-up deadband is included in the receiver, the set-up and the fine deadband will both be indicated by the Fine Deadband LED.

Blade Tilt Indication - MCR2+

If the MCR2+ has Version 5 software and the tilt indication is on, the RD15 LED's will mimic the receiver tilt display and provide 5 channels of tilt indication. If the MCR2+ receiver has Version 4 software, the tilt display will always be on and shown in the fine tilt accuracy. Refer to the receiver operating manual for specific blade tilt indicator settings.

Blade Tilt Indication - MCR3

Although there is no provision for displaying blade tilt on the MCR3 receiver itself, the function can be activated if the receiver has Version 5 software. Activation requires simultaneously pressing the power switch, plumb switch, and deadband switch of the receiver. When successfully activated, the receiver's outside green on-grade LED's will blink, the center green LED will be on and the RD15 tilt display will become active. Repeat the three button procedure to turn the display off. The receiver's outside green on-grade LED's will blink and the center green LED will be off. The blade tilt deadband is fine, or ± 0.5°. If the MCR3 receiver has Version 4 software, the tilt display will always be on.

Operation - Function Switches

The right side Select Function switch is pressed one or more times to select a function. When selected, the appropriate LED will light and a 4 second time period is available to set the function with the left side Set Function switch. If the function is not set within this time, the LED will go off and the switches will be deactivated.

Set Offset: The Set Offset function allows a current laser strike location to become the on-grade location. This is useful for raising or lowering the initially set on-grade location. To activate, position the receiver to the desired offset elevation while receiving a laser strike. Press the right side Select Function switch once. The first LED from the top will light. Press the left side Set Function switch one time to set (press for less than 2 seconds to avoid turning off).

The grade indication will now show green on-grade and the amber Offset Elevation LED will turn on solid if the command is accepted. No changes or indications will be shown if the command is not accepted.

Each receiver has a range over which it will accept this function depending on the model and deadband selected. Approximately 1 inch (2.5 cm) from the edge of the photocell array is the acceptance limit on proportional receivers so that both above and below grade information can be displayed. Refer to the chart on page 13.

NOTE: The Offset function will not operate when a MCR3 is in the angle compensation (ACE) mode.

To return to the default on-grade location, press the right side Select Function switch four times. The fourth LED from the top will light. Press the left side Set Function switch one time to set (press for less than 2 seconds to avoid turning off). The amber Offset Elevation LED will turn off confirming the return.

Operation - Function Switches

Set Temporary Offset: The Set Temporary Offset function allows a current laser strike location to become the second temporary on-grade location. This is useful for temporarily raising or lowering the offset on-grade location. To activate, position the receiver to the desired temporary offset elevation while receiving a laser strike. Press the right side Select Function switch 2 times. The second LED from the top will light. Press the left side Set Function switch one time to set (press for less than 2 seconds to avoid turning off).

The grade indication will now show green on-grade and the amber Offset Elevation LED will flash if the command is accepted.

NOTE: The Temporary Offset function will not operate when a MCR3 is in the angle compensation (ACE) mode.

To return to the initial offset on-grade location, press the right side Select Function switch three times. The third LED from the top will light. Press the left side Set Function switch one time to set (press for less than 2 seconds to avoid turning off). The amber Offset Elevation LED will turn solid confirming return to the offset location.

Alternatively, to return to the default on-grade location, press the right side Select Function switch four times and press the left side Set Function switch one time to set.

Operation - Function Switches

Receiver LED's On/Off: This function allows the receiver's LED's to be turned off and on. Turning off the receiver LED's will conserve battery life when the receiver is powered by batteries.

To turn the receiver LED's on or off, press the right side Select Function switch 5 times. The fifth LED from the top will light. Press the left side Set Function switch one time to set. The receiver LED's will turn off if they were on or on if they were off.

RD15 LED Brightness: The remote display brightness can be adjusted to suit user preferences and light conditions. The default setting is medium (6/8) brightness. To adjust, press the right side Select Function switch 6 times. The sixth LED from the top will light. Press the left side power switch to change the brightness. 8 levels of brightness are selectable. Each press will increase the brightness one level. The brightness will roll over to the dimmest display after the maximum display. After 4 seconds of no switch activity, the brightness will be set at the last selected brightness.

Deadband Selection (for MCR2E only): The deadband for the MCR2E with Version 5 software (which is normally adjusted by a control box) can be adjusted using the RD15. To adjust, press the right side Select Function switch 7 times. The seventh LED from the top will light. Press the left side power switch to cycle through fine, medium and coarse. The tilt display LED's will blink to indicate which deadband is selected.

Operation
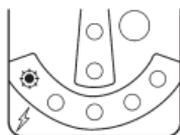
Low Battery Display: The left LED of the tilt display will blink to indicate a low battery condition. The tilt display will no longer operate. Replace or recharge the batteries of the receiver.

Lost Communication Display: The second above grade and second below grade red LED's and the green on-grade LED of the grade display will alternately blink indicating communication between the receiver and the remote display has been interrupted. Check all connections.

Lost Beam Display: If the receiver moves vertically beyond the laser signal for a short period of time, a sequence of LED's will indicate which direction to move the blade or implement to pick up the laser beam.

Specifications

Compatible Receivers	MCR1+, MCR2+, MCR3, MCR2E (refer to the Software Version Operation Chart on page 13)
Power Options	Receiver cable & receiver batteries Machine battery cable, 10-30V Machine power outlet cable, 12V
Battery Life (MCR LED's Off)	Alkaline ~ 40 Hours Ni-MH ~ 26 Hours
Operating Temperature	-4° F to 140° F (-20° C to 60° C)
Storage Temperature	-40° F to 158° F (-40° C to 70° C)
Size	4.5 x 2 x 1.1 inch (11.4 x 5.1 x 2.8 cm)

Software Version Operation Chart

RD15 / MCR Feature	MCR Model	Current Version 5.xx	Prior Version 4.xx
MCR Power On	1+, 2+, 3	Can turn on/off	Does not turn on/off
MCR Power On	1, 2	Not Available	Does not turn on/off
Disable lost beam display	All	Can turn on/off	Can not turn off
Plumb mode flash to indicate out of range	2+, 3	Flashes same as receiver	Does not flash
LED down indications	3	7, same as MCR	5 LED down indications
Tilt indication	2+	Mimics receiver	Always On - Displays Fine tilt accuracy
Tilt indication	3	Can turn On or Off Displays Fine tilt accuracy	Always On - Displays Fine tilt accuracy
Locks Keypad	1+, 2+, 3	No	Yes
Locks Keypad	1, 2	Not Available	Yes
Offset Functions	1+	Limited range due to 2 inch (5 cm) proportional photocell array	
Compatibility	2E	Yes	No