

C O M M A N D R E C O N TM



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R E C O N 2 0 2 3 M A N U A L



1 800 761 1231



COMMAND RECON™

spireOS.

MASTER TOUCHSCREEN CONTROL MANUAL

Version 2.2 | Spire Ranges © 2023



Our customers are the heroes who make our world, countries, and communities safer. At Spire, we create exceptional shooting range systems that prepare them for when duty calls.

OUR MISSION?

EVERY HERO COMES
HOME SAFE.



CONTENTS

COMMAND RECON:

INTRODUCTION	10
WARRANTY	11
BALLISTIC RATINGS	12
LIMITATION OF LIABILITY	13

MASTER CONTROLS:

NAVIGATION	15
WELCOME	16
MAIN MENU	17
MANUAL SESSION	19
OPERATION CONTROLS	20
OPERATION INDICATORS	21
COURSE OF FIRE SESSION	23
MENU	24
TARGET SELECTION	25
COURSE OVERVIEW	26
COURSE START	27
IN PLAY	28
COURSE EDIT	29
RECON CONFIGURATION	31
MENU	32
SETTINGS	33
MASTER TO LOCAL	34
TARGET CALIBRATION	35

LOCAL CONTROLS:

NAVIGATION	37
HOME SCREEN	38
TARGET CALIBRATION	39
CHARGING SCREEN	40

CONTENTS

MAIN MENU	41
MASTER CONTROLLED	42
COMMUNICATION ERROR	43
MANUAL SESSION	45
MANUAL CONTROL	46
COURSE OF FIRE SESSIONS	49
COURSE SELECT	50
CUSTOM SETTINGS	51
COUNTDOWN	52
CURRENT COURSE	53
RANGE CONFIGURATION	55
MENU	56
CONFIGURATION SCREEN	57
DRILL SETUP	58
STANDARD KEYPAD	59

MOBILE CONTROLS:

MOBILE APP	62
ADD PROGRAM	63

RECON COMPONENTS:

CARRIER BILL OF MATERIALS	66
CARRIER COMPONENTS	74
CLAMP BILL OF MATERIALS & COMPONENTS	88
SPECIFICATIONS	89
CHARGE BOX COMPONENTS	90
CHARGE BOX BILL OF MATERIALS	91
TRACK COMPONENTS	94
CHARGING BRACKET COMPONENTS	95
TRACK KIT BILL OF MATERIALS	96

CONTENTS

MAINTENANCE:

WEEKLY / MONTHLY.....	99
TOOLS.....	100
LIST OF TOOLS NEEDED FOR MAINTENANCE.....	101
SCHEMATICS	102
CARRIER	103
CHARGE BOX	104
LOCAL HMI TOUCH SCREEN.....	105
MASTER HMI TOUCH SCREEN.....	106
BATTERY REPLACEMENT PROCEDURE.....	109
POSITION RECON.....	110
LEFT PANEL.....	111
UNPLUG BATTERY	112
REPLACE BATTERY	113
CHARGING BRACKET/SENSORS	114
BRACKET PLACEMENT	115
REMOVING SIDES.....	116
SENSOR GAP	117
ROCKER ARMS	118
REPLACING SIDES.....	119
RECOMMENDED REPLACEMENT PARTS	120
RECON REPLACEMENT PARTS LIST.....	121

SERVICE PLANS:

SERVICE PLANS	126
SERVICES OFFERED.....	127

TROUBLESHOOTING:

HMI TOUCH SCREEN.....	130
CARRIER	132
BULLET LED INDICATORS	136

CONTENTS

NANOSTATION LED INDICATORS	138
CHARGING BOX LED INDICATORS	140
PLC LED INDICATORS	142
CIRCUIT BOARD LED INDICATORS	144
DRIVING MOTOR DRIVER LED INDICATORS	146

GLOSSARY OF TERMS:

GLOSSARY	150
SYMBOLGY	152

COMMAND RECON INTRODUCTION

The Command Recon is a motion-controlled, overhead, turning target system that is ideal for any range's customized training programs and courses of fire. Electric-powered motors quickly and quietly turn targets 90, 180 and 360° with random edging and friend/foe presentation. Targets can be controlled individually, or synchronized with a Spire master control touch screen and/or app. The Recon system is indoor-rated and proven durable, making it an ideal target system for all types of facilities and organizations; including law enforcement, military, government, commercial, and private ranges.

MASTER CONTROL CONSOLE OVERVIEW

The Master Control Console allows a range master to manually control drills for an individual position or for all of the positions simultaneously on the range. As an option, a phone app allows for the rangemaster to control the system from the firing line.

LOCAL CONTROL CONSOLE OVERVIEW

The Local Control Console allows a range user to manually control drills for their individual position. The Local Control Console also comes pre-programmed with various games that can be started by the user.

IMPORTANT SAFETY INFORMATION



Maintenance and use must adhere to the guidelines in this manual. Improper use of any of the equipment can result in poor performance, product damage and even serious physical injury. Properly trained personnel should only operate the equipment within the range. For technical, mechanical and electrical maintenance, it is recommended that a trained professional be consulted. Protective headwear, eyewear and gloves should always be worn when performing any maintenance. Danger risks include, but are not limited to, electric shock, head injuries, limb or body crushing, and eye trauma.

WARRANTY OF EQUIPMENT

Refer to agreement documents for specific warranty details for your range. Consumables, negligence, and improper use of equipment (including firing armor-piercing rounds or calibers not approved for your range's ballistic rating) are excluded from all warranties.

All products provided and installed by Spire Ranges are warranted against defects in material or workmanship under normal use and service, subject to limitations detailed below. Warranty period begins at the conclusion of the original installation.

This warranty applies to the original installation only. This warranty does not cover damages caused by improper installation, misuse, or lack of proper maintenance. This warranty does not cover damages caused by alterations or repairs made by anyone who is not pre-authorized in writing by Spire Ranges to modify, alter, repair, or otherwise handle in any way the product.

Spire Ranges reserves the right to determine if any part is defective and to repair or replace parts as it elects. This warranty does not cover shipping costs of defective parts from the owner's site. Return shipping to the site is covered by Spire Ranges during the warranty period. This warranty covers on site labor, travel expenses and accommodations if applicable.

Damage of Spire Ranges equipment resulting in utilizing armor piercing (AP) ammunition or tracer rounds will not be covered under warranty. In addition, high velocity rounds (both ball and frangible) traveling at speeds more than 3000 fps may result in wear, dimpling and pocking of the 1/4" AR500 ballistic shields and target clamps depending on the angle of impact. Such wear, dimpling, and pocking under these conditions is not covered under warranty.

BALLISTIC RATINGS

Ammunition specs listed below are examples of energy and velocity only. Note, any use of Armor Piercing (AP), Steel Core, or Tracer Rounds will void the warranty.

PLATE RATING	MUNITIONS TYPE	MAX ENERGY	MAX VELOCITY
1/4" AR500	Pistol	1175 ft-lbs	1485 fps
3/8" AR500	Pistol/Rifle	3600 ft-lbs	3300 fps
TYP. AMMO	BULLET WEIGHT	MAX ENERGY	MAX VELOCITY
.22 LR	40 gr HP	140 ft-lbs	1400 fps
9MM LUGER	124 gr FMJ	460 ft-lbs	1293 fps
.357 MAG	158 gr JSP	663 ft-lbs	1375 fps
.44 MAG	240 gr SWC	1175 ft-lbs	1485 fps
5.56X45MM NATO	55 gr FMJ	1402 ft-lbs	3388 fps
7.62X51MM NATO	150 gr FMJ	3048 ft-lbs	3025 fps
.308 WIN	150 gr SPTZ	2800 ft-lbs	2900 fps
30-06	180 gr SPTZ	3360 ft-lbs	2900 fps

TYP. AMMO	BULLET WEIGHT	MAX ENERGY	MAX VELOCITY
300 WM	190 gr BTHP	3548 ft-lbs	2900 fps

Spire Ranges products can handle .50 BMG in moderation; however, due to the large amounts of energy exerted from the round, the following applies:

Repeatedly using .50 BMG will shorten the life expectancy of the product and may void warranty.

Repeated impacts of .50 BMG fired in the same location of the product can cause damage in as few as 50 rounds.

Any armor piercing (AP) rounds, particularly those from .50 BMG will void any warranty.

LIMITATION OF LIABILITY

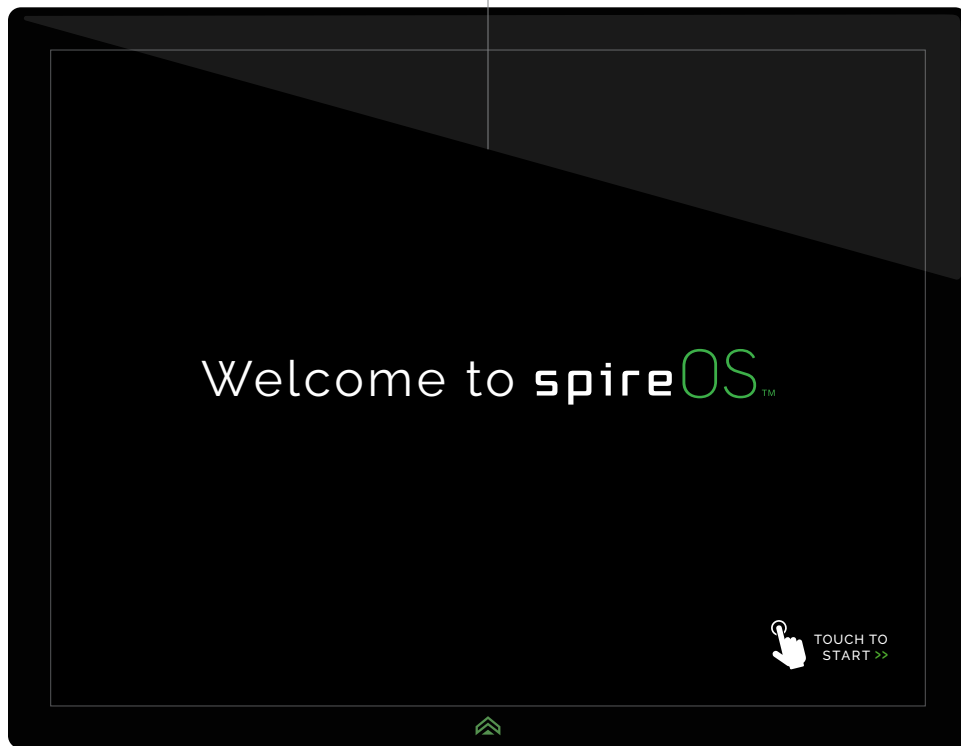
Neither Spire Ranges, nor any company affiliated with it, makes any warranties, representations or promise as to the performance or quality of the product other than what is specified in the original agreement between Spire Ranges and the range Owner. The liability of Spire Ranges to the Owner for damages arising out of the manufacture, sale, delivery, use of resale of this product shall be limited to and shall not exceed the cost of repair or replacement of defective parts. Spire Ranges shall not be liable for loss of use, inconvenience or any other incidental, indirect or consequential damages.

No representative of Spire Ranges has the authority to make any representation or promise on behalf of Spire Ranges or to alter or modify the terms or limitations of warranties in any way.

MASTER CONTROLS:

NAVIGATION

Start by touching anywhere



Manual Operation Screen

p. 20

Courses of Fire Menu

p. 24

Range Calibration

p. 35



RECON
OPERATION



COURSES
OF FIRE



TREADWELL
OPERATION



TARGET
CALIBRATION

RANGE
SETTINGS



Treadwell Operation
(optional)

Range Settings Menu

p. 33

MANUAL SESSION

Navigation back to Main Menu
p. 17

Target Face & Edge Control

Current distance of individual target

1 25
2 00
3 00
4 00
5 25
6 00
7 00
8 00
9 00
10 25

3 5 7 9 11 15 17 19 21 25

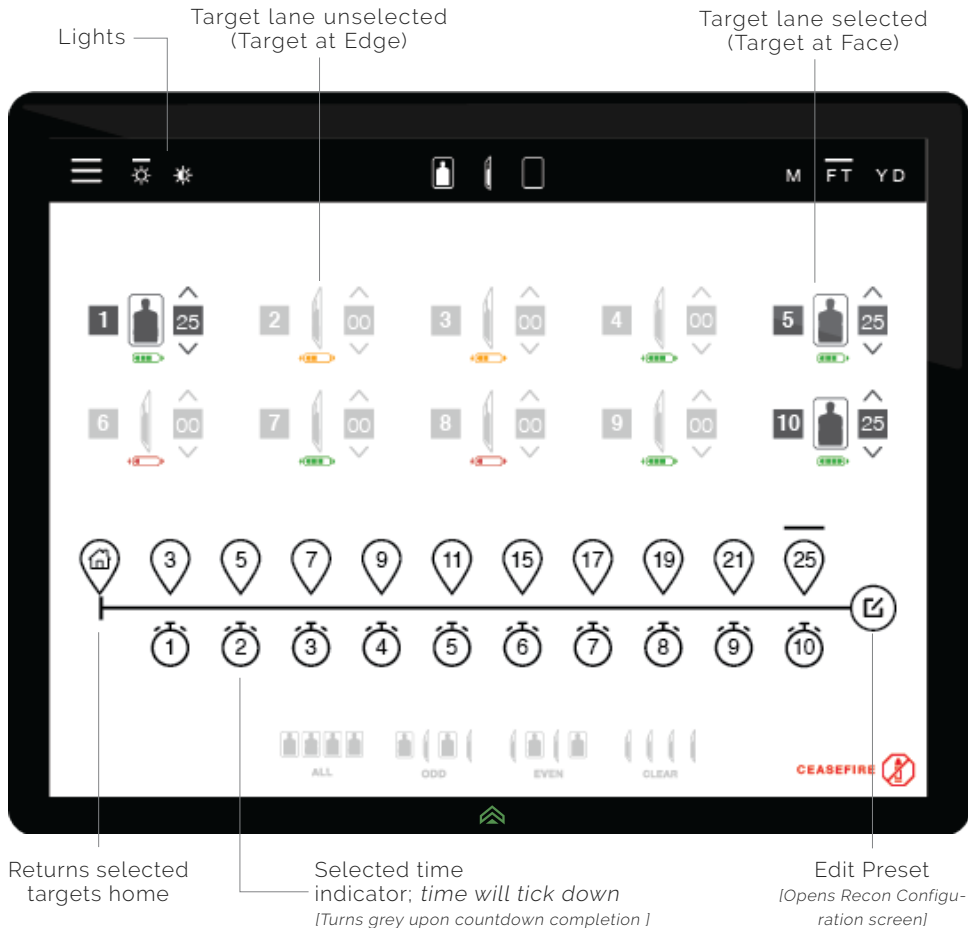
1 2 3 4 5 6 7 8 9 10

ALL ODD EVEN CLEAR

CEASEFIRE

Multi-lane quick-selection:
All, Odd, Even & Clear

Multi-lane distance selection



COURSE OF FIRE SESSION

Navigation back to Main Menu
p. 17

Ten courses of fire set
by the Range Master
[Course 5 Selected]



Edit selected course of fire
p. 29

Navigation to Target Selection
for selected course of fire
p. 25

Navigation back to
Courses of Fire Menu
p. 24

Target lane
selected

Target lane
selected

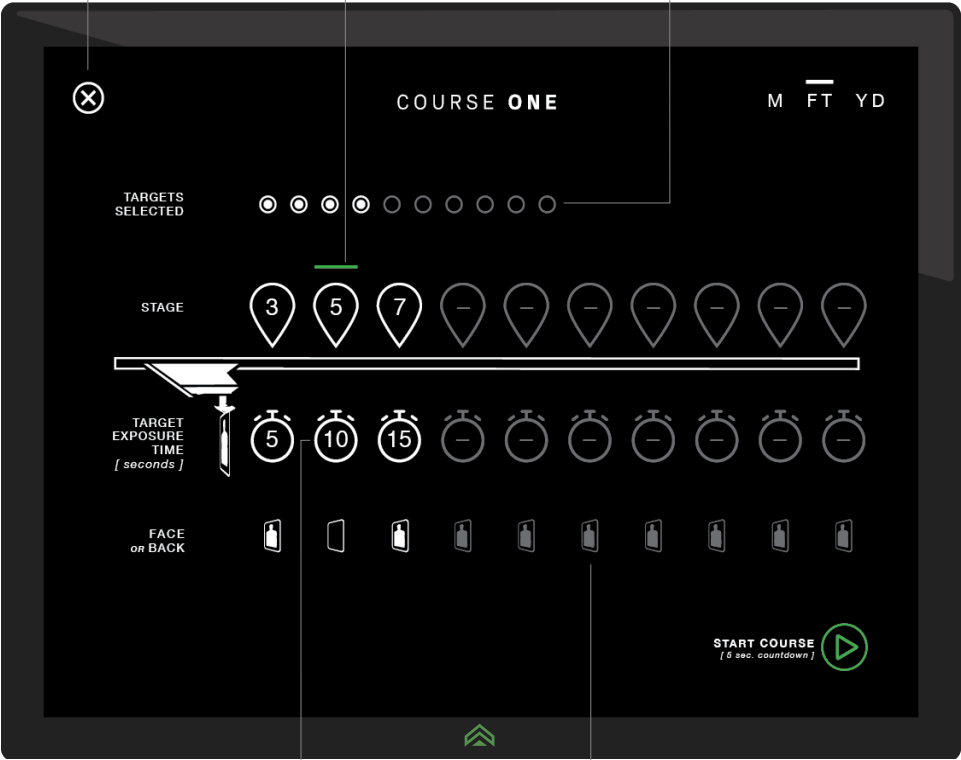


Navigation to Course
In Play
p. 28

Navigation back to
Courses of Fire Menu
p. 24

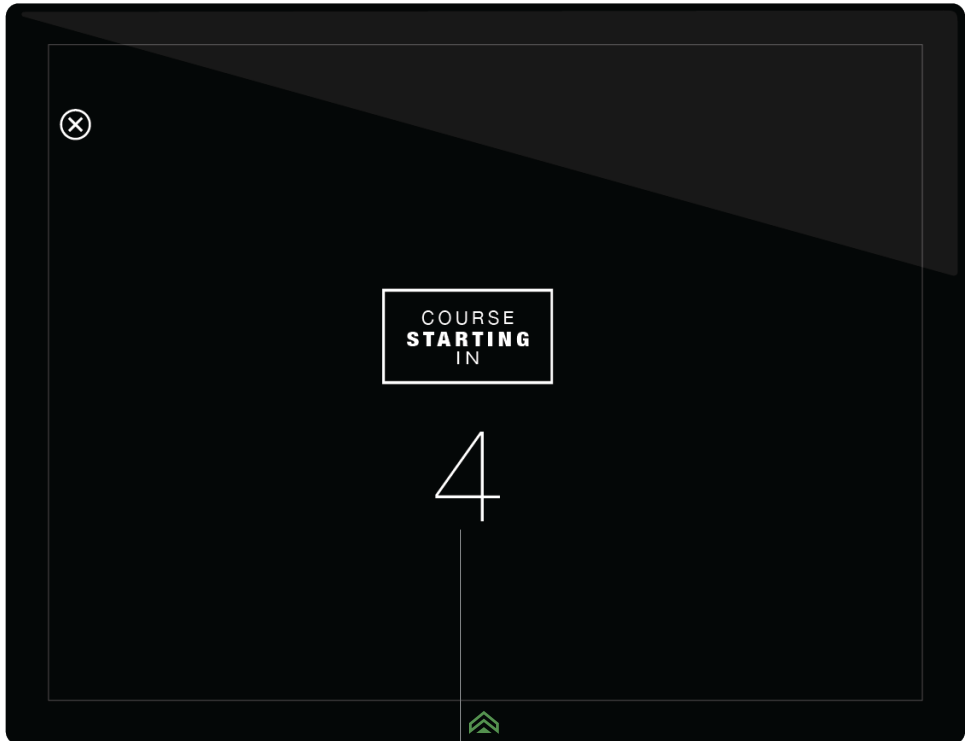
Distance
presets in
course

Selected targets indicators
[Filled dot indicates selected]



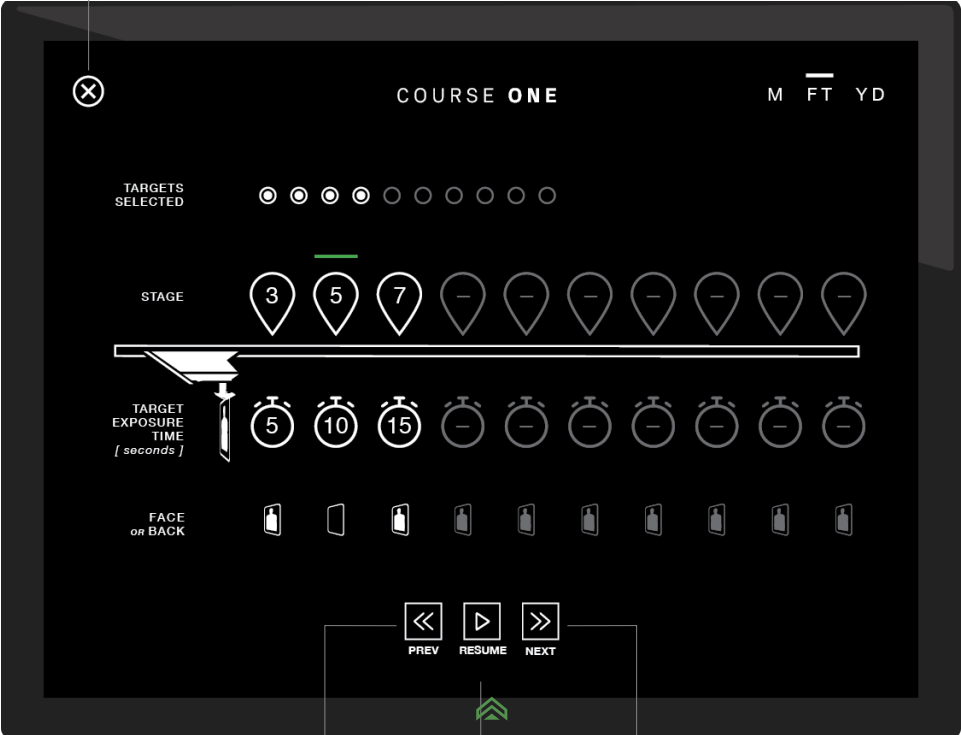
Exposure
times at
stage

Target
Exposure
at stage



Time till course begins

Back to Courses of Fire menu
p. 24



Previous stage

Pause / start stage

Next stage

Increase or decrease the number of active stages for the course of fire

Edit distance
*iPad master opens key pad
 HMI opens new page*

COURSE ONE

OF STAGES — 3 +

STAGE DISTANCES

STAGE DISTANCES	TARGET EXPOSURE TIME [seconds]	FACE or BACK
3	5	Back
5	10	Front
7	15	Back
-	-	Back
-	-	Front
-	-	Back
-	-	Front
-	-	Back
-	-	Front
-	-	Back
-	-	Front
-	-	Back

TARGET EXPOSURE TIME [seconds]

FACE or BACK

SAVE

Edit time
*iPad master opens key pad &
 HMI opens new page*

Target Exposure
[Front, Back, Edge]

Inactive times

Save & return to courses of fire menu
 p. 24

RECON CONFIGURATION



Opens Recon
configuration
p. 33

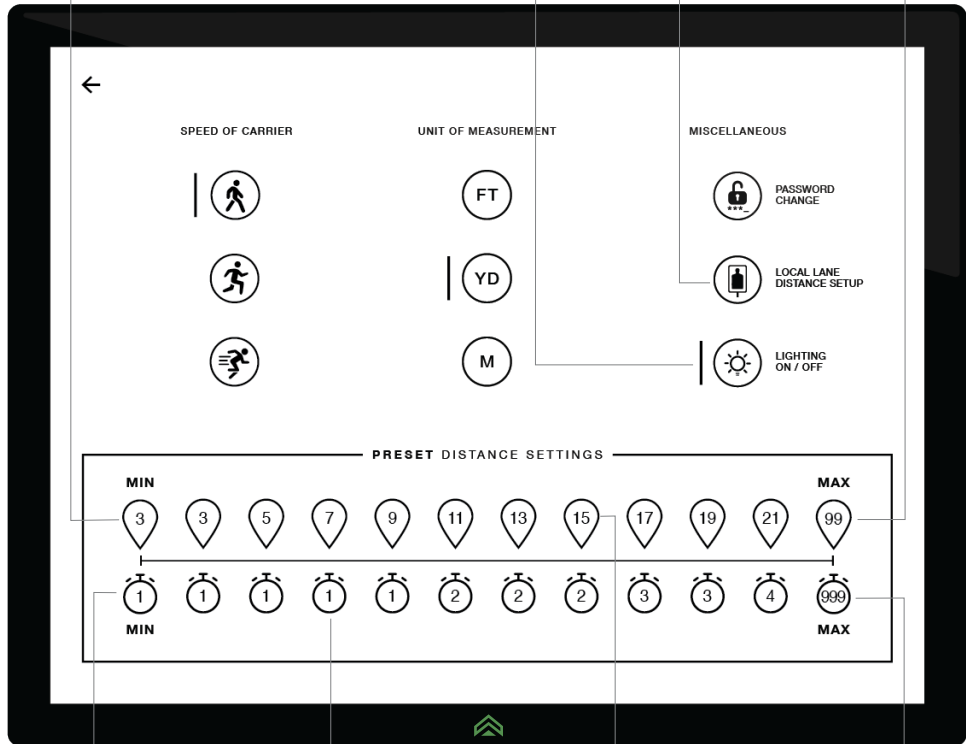
Spire
Installers
only

Sets min distance on master control

Hides lights on local controls

Opens Master to Local screen
p. 34

Sets max distance on master control

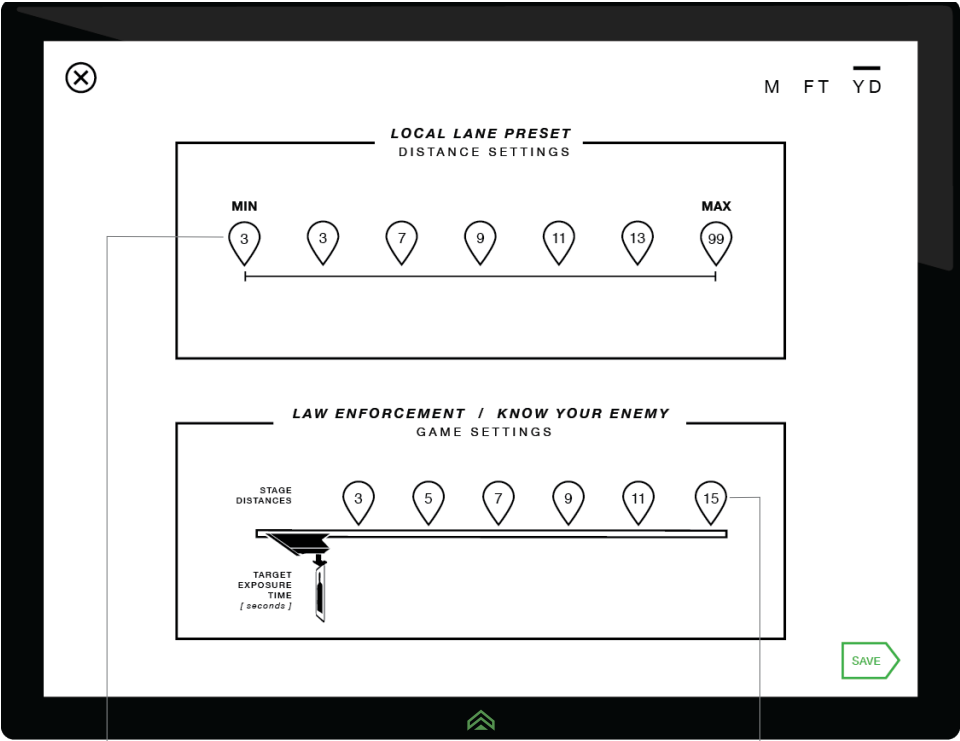


Sets min time exposure on master control

Sets preset time on master control

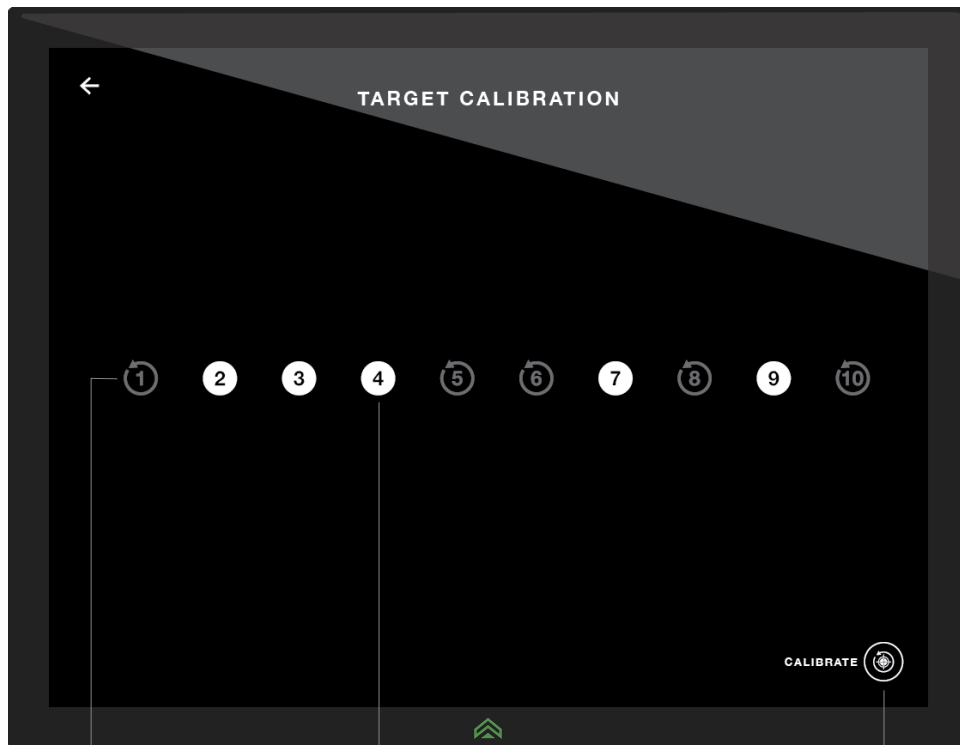
Sets preset distance on master control

Sets max exposure time on master control



Sets distance preset and min and max distance for local controls

Sets distance preset for local controls



Unselected
target carrier
to calibrate

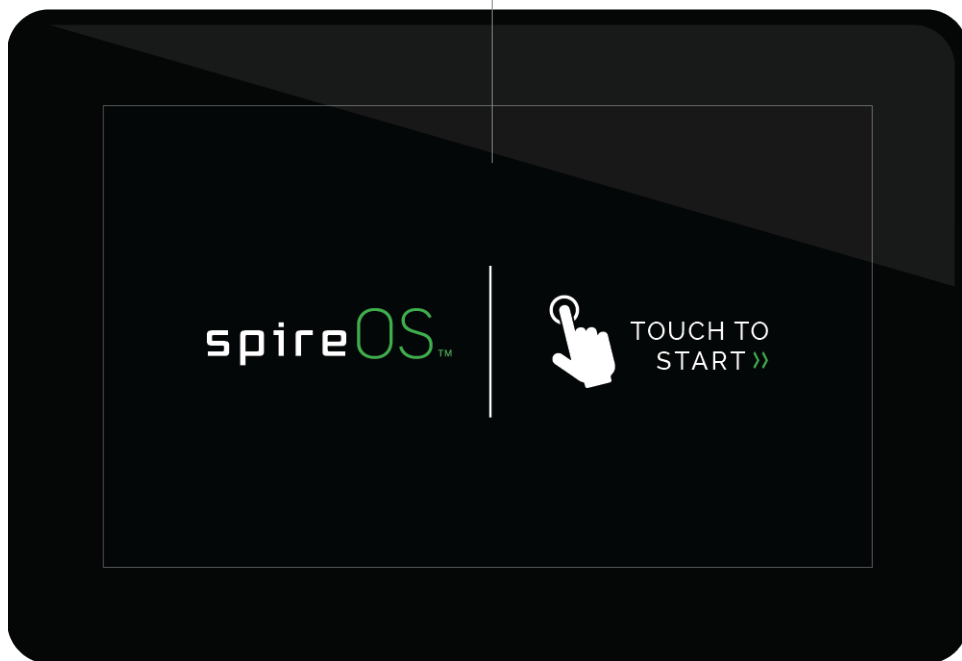
Selected target
carrier to calibrate

Calibrates se-
lected targets

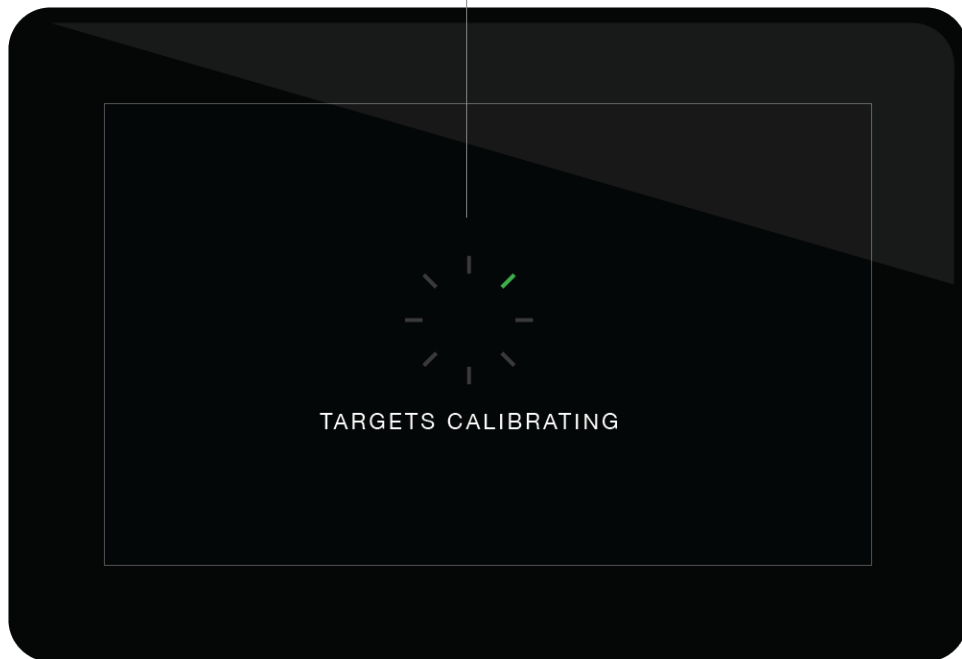
LOCAL CONTROLS:

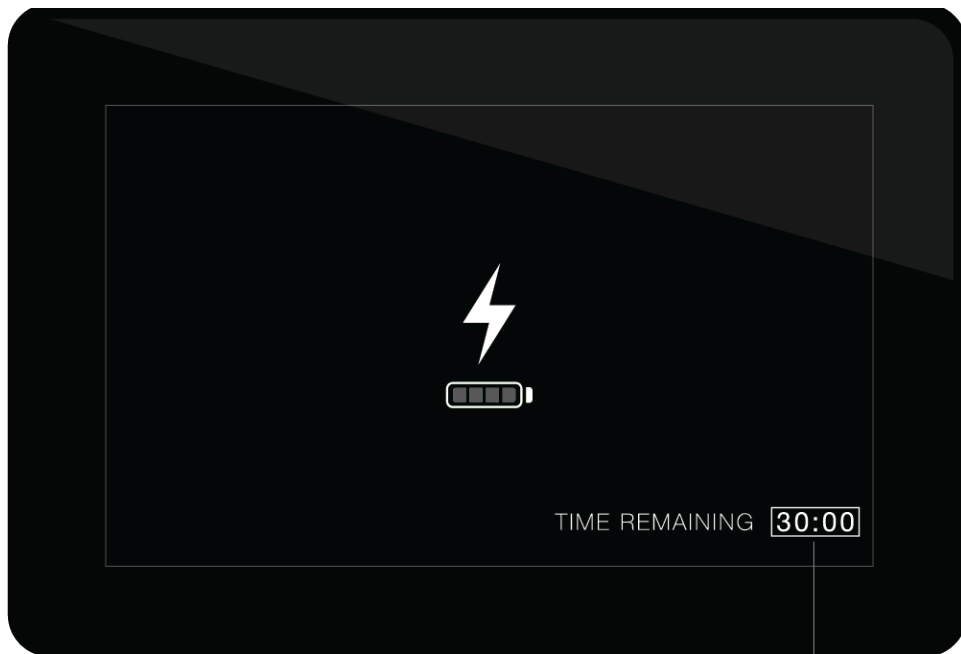
NAVIGATION

Start by touching anywhere



Targets calibrate once powered on

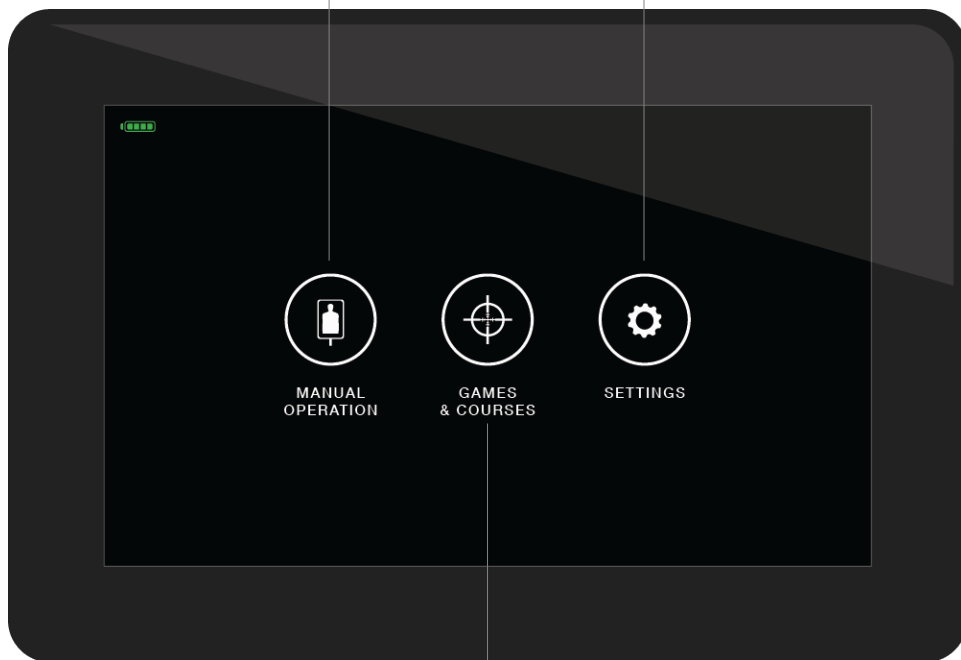




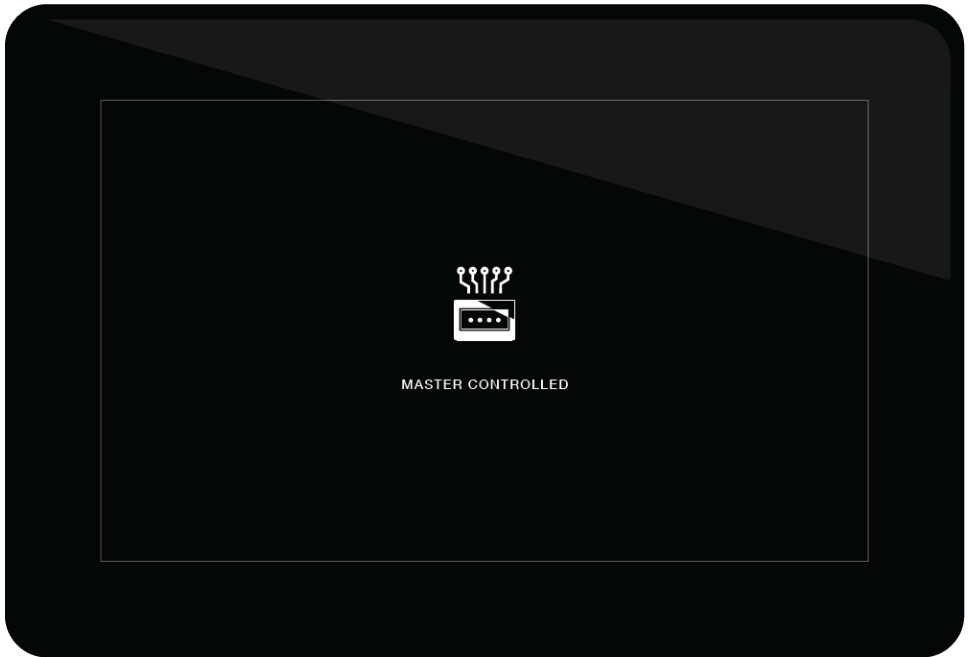
If Recon dies, the above screen locks controls until the 30:00 min charge time has completed.

Manual Operation Screen
p. 46

Range Setting Menu
p. 56



Courses of Fire Menu
p. 50



Master Controlled screen appears when target is selected by a master (15" HMI, iPad, or other mobile device).

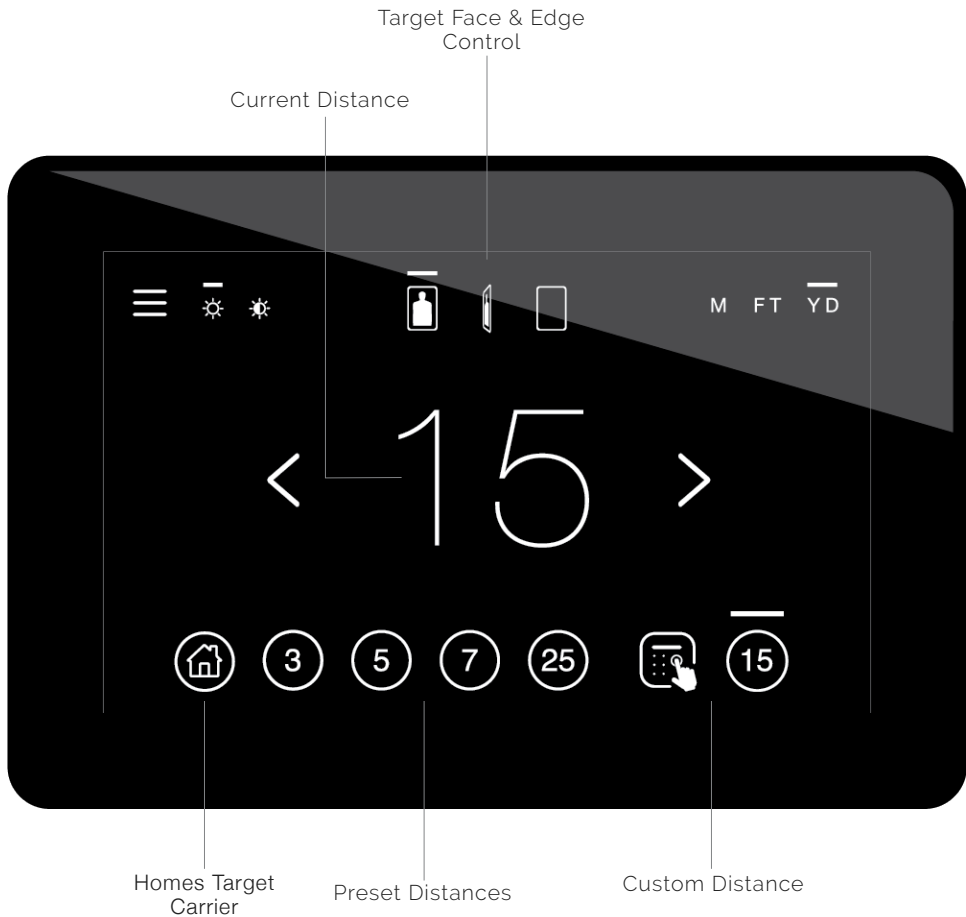
Master control can be over-ridden at the local station by touching the screen for 5+ seconds.

If screen below appears, see the troubleshooting section of manual p. 130

! COMMUNICATION ERROR

- ↳ Check carrier for power.
- ↳ If powered without response, reset.
- ↳ If still nonresponsive, contact Spire:
1-800-761-1231

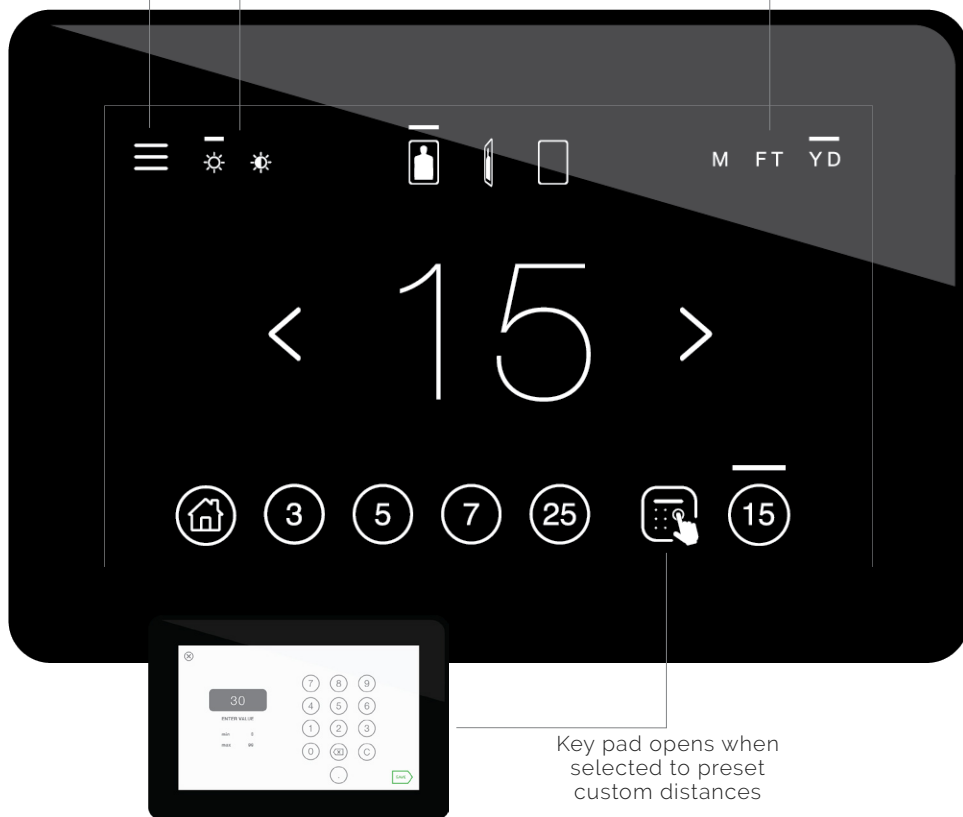
MANUAL SESSION



Back to
Main Menu
p. 41

Target Light
Controls

Distance Units

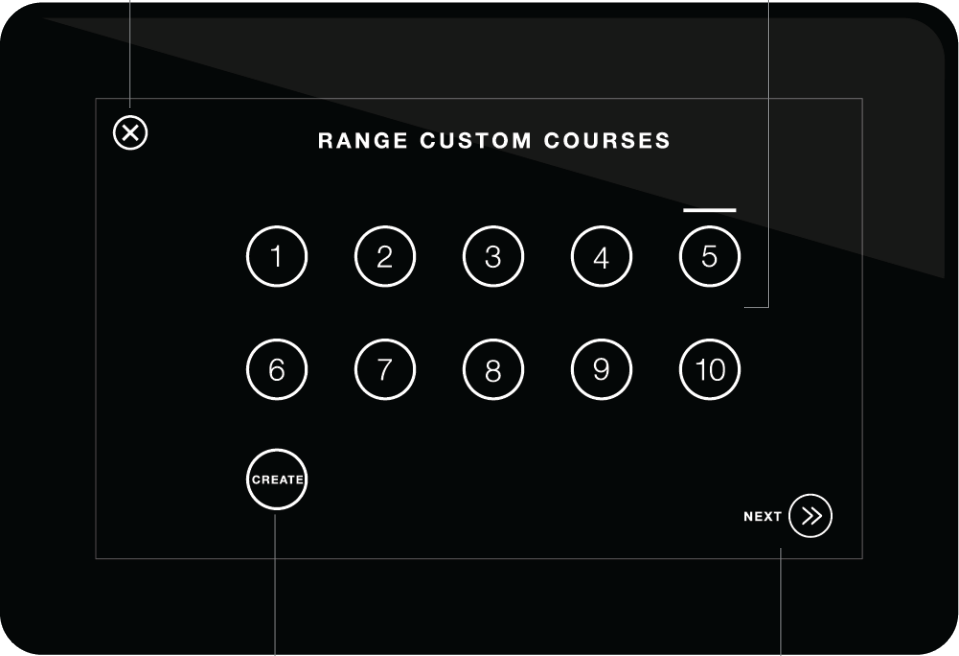


Key pad opens when
selected to preset
custom distances

COURSE OF FIRE SESSIONS

Navigation back to Main Menu
p. 41

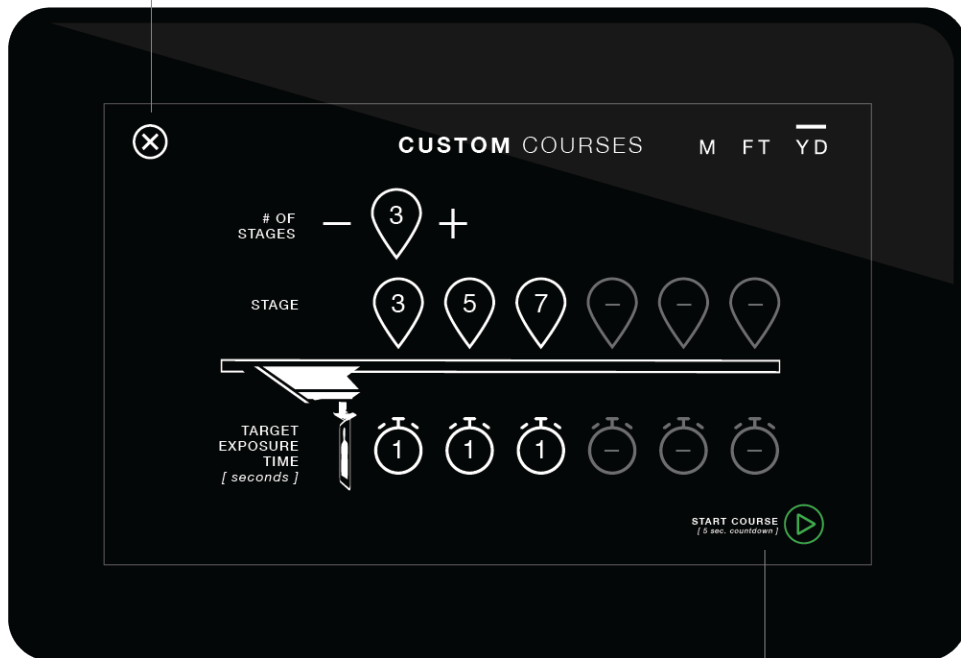
10 Courses of Fire Set
by the Range Master
[Course 5 Selected]



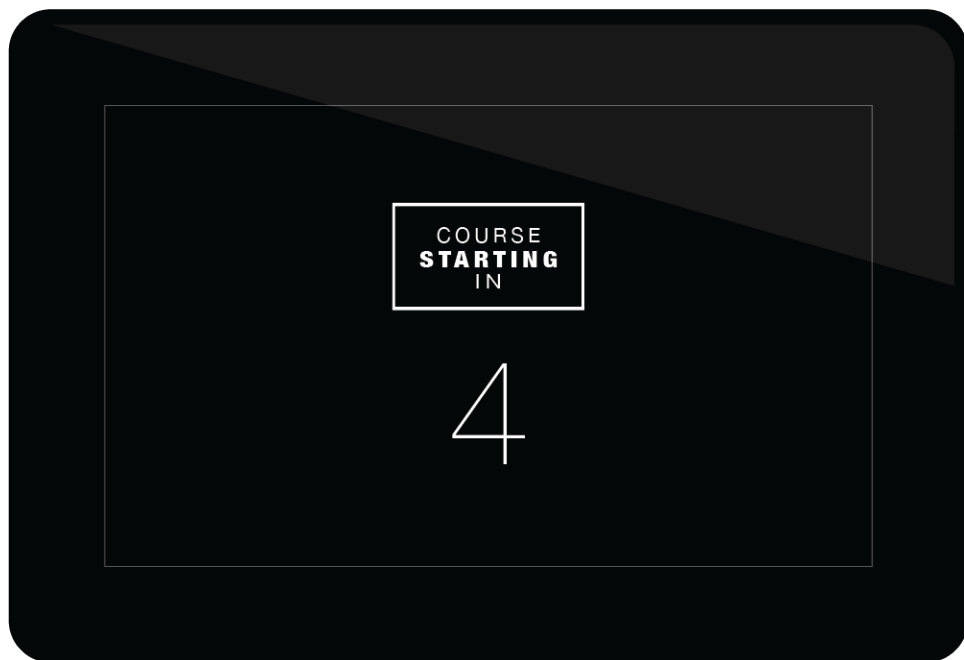
Edit Selected Course of Fire

Next Opens to the Countdown Screen
(p. 52) then Begins Course (p. 53)

Navigates Back to
Course Select Screen
p. 50

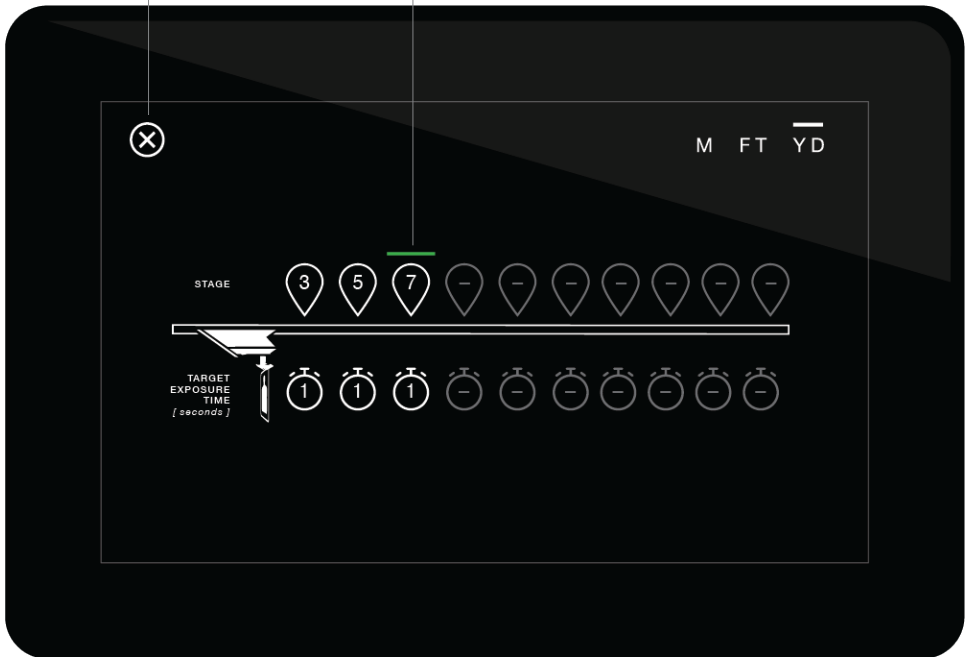


Start Opens the Countdown Screen
(p. 52) then Begins Course (p. 53)

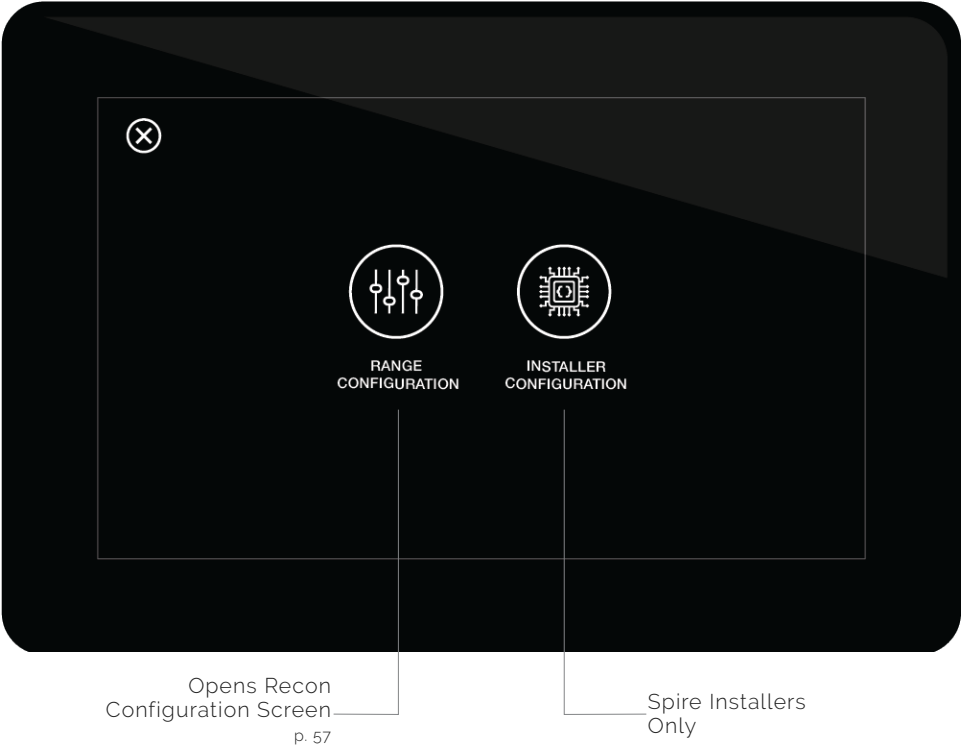


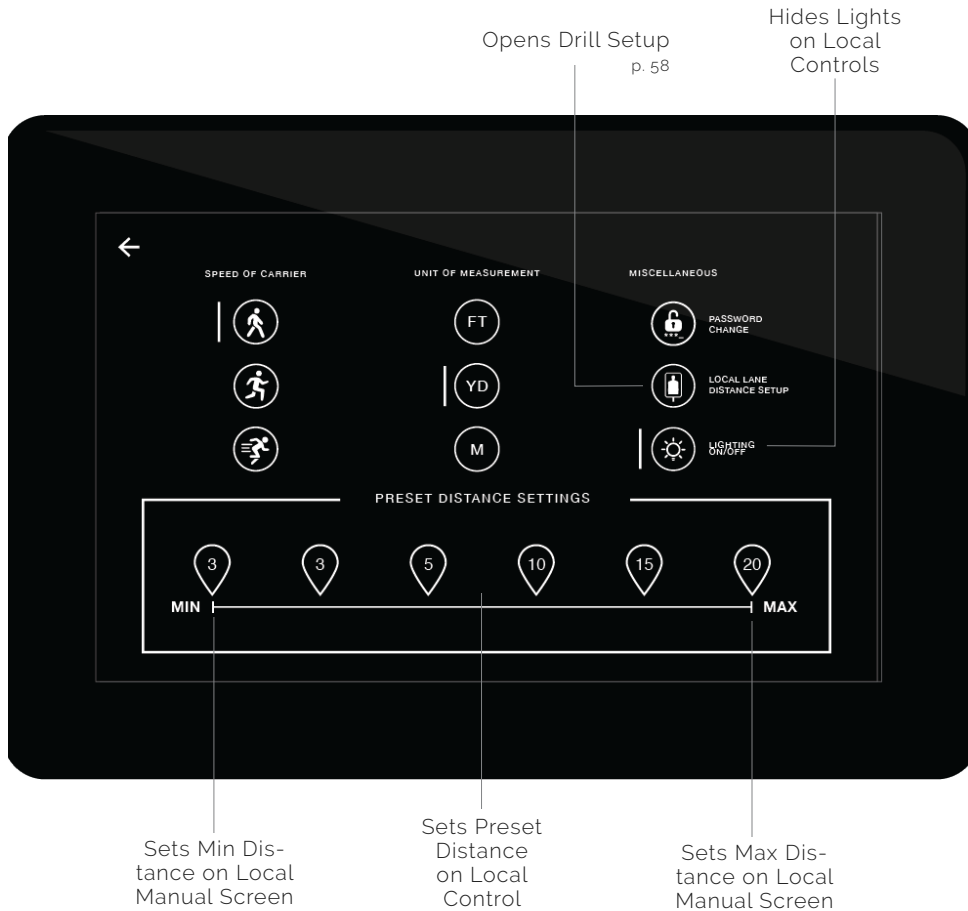
Navigates Back to Course Select
p. 50

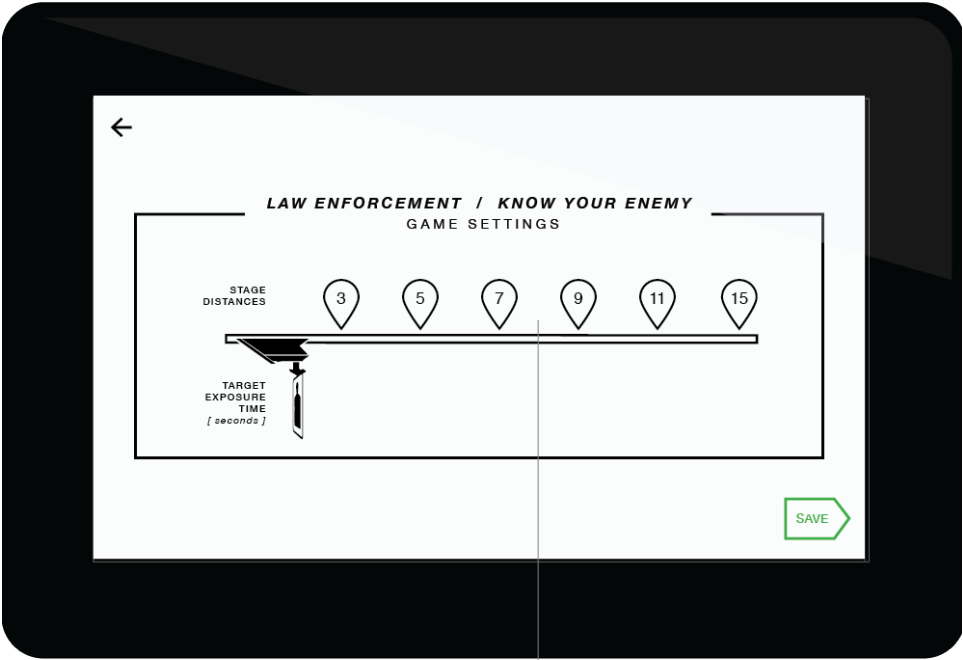
Course Stage Mark
Indicates the Current Stage of
the Course



RANGE CONFIGURATION







Edit Preset Distances
(Opens Keypad)

p. 59

✕

30

ENTER VALUE

min 3

max 99

7 8 9

4 5 6

1 2 3

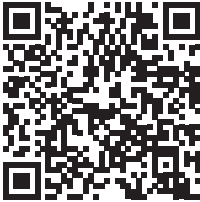
0 <✕> C

.

SAVE

MOBILE CONTROLS:

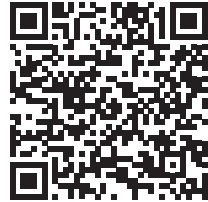
[1] Download cMT Viewer App for the device.



Android



Apple



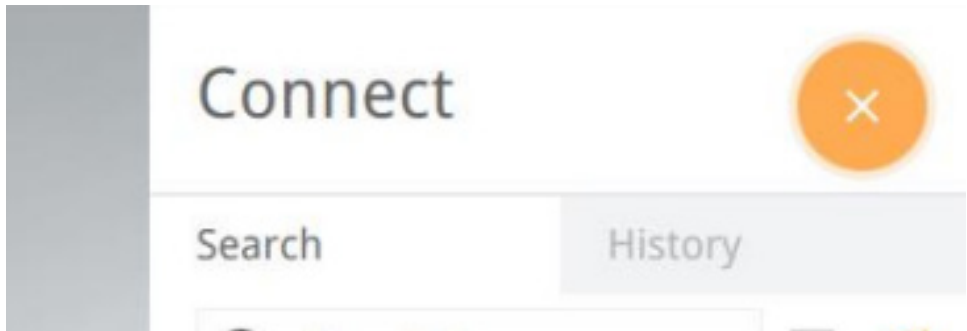
Windows

[2] Connect to the range WiFi.

- WiFi: RangeAccess
- Password: spireranges

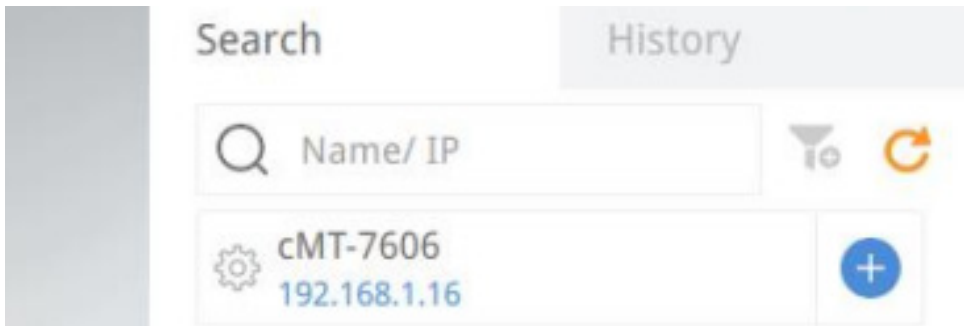
[3] Open cMT Viewer.

[4] Press the orange "+" at the top of the screen.



[5] The program should appear. Generally it will have the address of 192.168.1.61. Press the "+" button to add the program. Password is 111111 (six 1's).

- If the program does not appear automatically, try pressing the orange reload button.
- If it still does not appear, try typing 192.168.1.61 into the Name/IP field.
- **Note:** Generally the IP address for your range will be 192.168.1.61 as mentioned above. But, some ranges are unique and will have a different address. This is especially common when there are multiple bays in your range and each bay has a different master control. In that case, try the following addresses:
 - Bay 1: 192.168.1.61
 - Bay 2: 192.168.1.62
 - Bay 3: 192.168.1.63
 - etc.
- If those do not work, contact Spire.
- **Note:** If the Master Control screen is not working, then the app will generally not work either. Generally the app gets its program from the master screen.



[6] The Operations Screen should load if everything is working correctly.

RECON COMPONENTS:

CODE	DESCRIPTION	PRT #	QTY
1	18 GA.X.375 CRIMP RING TERM-NY	ECRT-18-375	2
2	1"X1" NYLON WIRE TIE MOUNT	ELE-1010-WTM	8
3	**24V 10 AH LIFEP04 BATTERY PVC PACK	RCR-BATT-000	1
4	35MM DIN RAILX3"	ELE-3001-030	1
5	TERMINAL BLOCK END STOP	ELE-3012-101	2
6	MITSUBISHI ANALOG MODULE	ELE-6005-542	1
7	**UBIQUITY BULLET-M2	ELE-6138-200	1
8	LITHIUM BATTERY FEMALE CABLE	ELE-6424-040B	1
9	**STEPPER MOTOR DRIVER	ELE-76575-275	1
10	MOTOR DRIVER WIRE HARNESS(HARNESS2)	ELE-HARN-02	1
11	MOTOR AND BATTERY WIRE(HARNESS3)	ELE-HARN-03	2
12	POWER SWITCH WIRE(HARNESS4)	ELE-HARN-04	1

** Indicates recommended replacement parts. (See p. 120 for more information)

*** Indicated parts that are consumables and are not covered under the warranty agreement. In addition, any misuse, lack of maintenance, and/or modifications made to any Spire products will void all warranties.

CODE	DESCRIPTION	PRT #	QTY
13	PLC TO PCB WIRE(HARNESS7)	ELE-HARN-07	1
14	NANOTECH MOTOR COMMUNICATION HAR- NESS	ELE-HARN-COM	1
15	NANOTECH MOTOR POWER HARNESS	ELE-HARN-PWR	1
16	**14MMX34MM SINGLE STACK STEPPER MOTOR	ESM-3414-PD6S	1
17	CAT5E PATCH CABLE-1FT	ETH-CAT5-012	1
18	CAT5E PATCH CABLE-2FT	ETH-CAT5-024	1
19	**TACTICAL LIGHT LEXAN COVER	FBP-7072-202	1
20	06#-32X3/8" BUTTON HEAD SCREW SS	HBH-0632-038-SS	6
21	1/4"-20X1/4" BUTTON HEAD SCREW SS	HBH-25020-025-SS	2
22	**1/4"-20X5/8" BUTTON HEAD SCREW SS	HBH-25020-063-SS	72
23	1/4"-20X3/4" BUTTON HEAD SCREW SS	HBH-25020-075-SS	4
24	1/4"-20X1" BUTTON HEAD SCREW SS	HBH-25020-100-SS	4
25	1/4"-20X1-1/4" BUTTON HEAD SCREW SS	HBH-25020-125-SS	2

CODE	DESCRIPTION	PRT #	QTY
26	1/4"-20X1-3/4" BUTTON HEAD SCREW SS	HBH-25020-175-SS	6
27	3/8"-16X1" BRASS BUTTON HEAD	HBH-37516-100-BZ	2
28	1/2"X1-1/8"X5/16" (FR8-2RS) FLANGE BEARING	HBR-FR8-2RS	12
29	1/2" 2-BOLT PRESSED FLANGE BEARING	HBR-SFL205-008	2
30	1/4"-20X 1/2" CARRIAGE BOLT ZINC	HCB-25020-050-ZN	2
31	1/4"-20X3/4" CARRIAGE BOLT ZINC	HCB-25020-075-ZN	2
32	1295MM X 5M09 X 17T DRIVE GEAR	HDB-5M09-1295	2
33	425MM X 5M15 DRIVE GEAR BELT	HDB-5M15-425	1
34	1/2" X 5M09 X 17T DRIVE GEAR	HDG-050-5M09-017	4
35	1/2" X5M09 X 25T DRIVE GEAR	HDG-050-5M09-025	2
36	1/2" X 5M15 X 60T DRIVE GEAR	HDG-050-5M15-060	1
37	14MM X 5M15 X 20T DRIVE GEAR	HDG-050-5M15-14M	1
38	3/16" X 1" QUARTER GROOVED DOWEL PIN	HDP-188QG-100	1

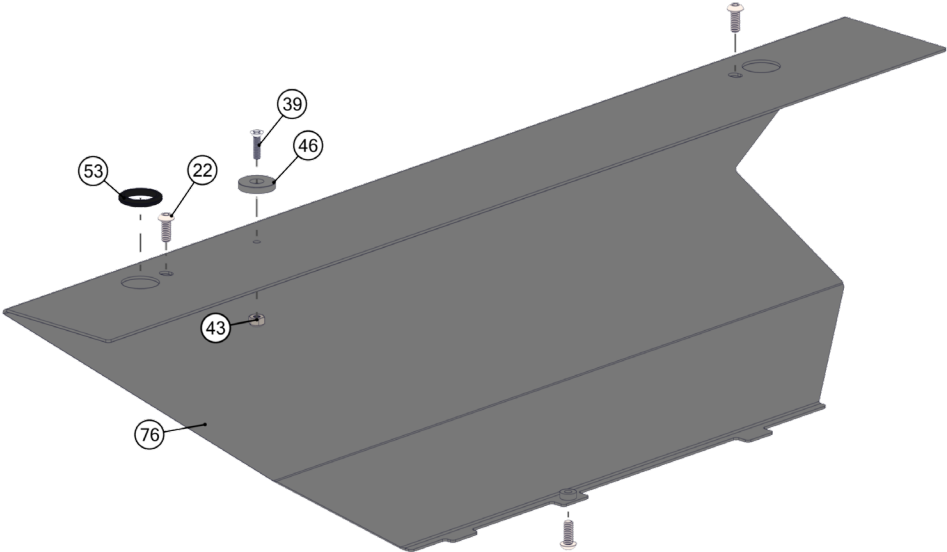
CODE	DESCRIPTION	PRT #	QTY
39	#10-32 NYLOCK NUT W/ WASHER	HFH-1032-063-ZN	2
40	1"WX1/16" FOAM WEATHER STRIP TAPE	HFS-10063	2
41	3/8"X3/4"X.060 NYLON INSULATING WASHER	HIW-375750-060-NY	6
42	3/8"-16 NUT W/ WASHER (KEPS)	HKN-37516-008-ZN	2
43	#10-32 NYLOCK NUT-ZINC	HLN-01032-005-ZN	2
44	**1/4"-20 THIN NYLOCK NUT-ZINC	HLN-25020-001-ZN	6
45	1/4"-20 NYLOCK NUT-ZINC	HLN-25020-005-ZN	12
46	1"X#10X3/16" NEODYMIUM DISC MAGNET	HMG-10010-188-42S	2
47	#8-32 X 1/2" PAN HEAD SCREW SS	HPH-08032-050-SS	2
48	#8-32 X 1-1/4" PAN HEAD SCREW- ZINC	HPH-08032-125-ZN	4
49	1"X9/16" HOLE UNTHREADED BUMPER	HRB-100219-563	2
50	1-1/2"ID X 1/8" GROOVE RUBBER GROMMET	HRG-150138-013	1
51	3/8"ID X 1/8" GROOVE RUBBER GROMMET	HRG-375088-013	2

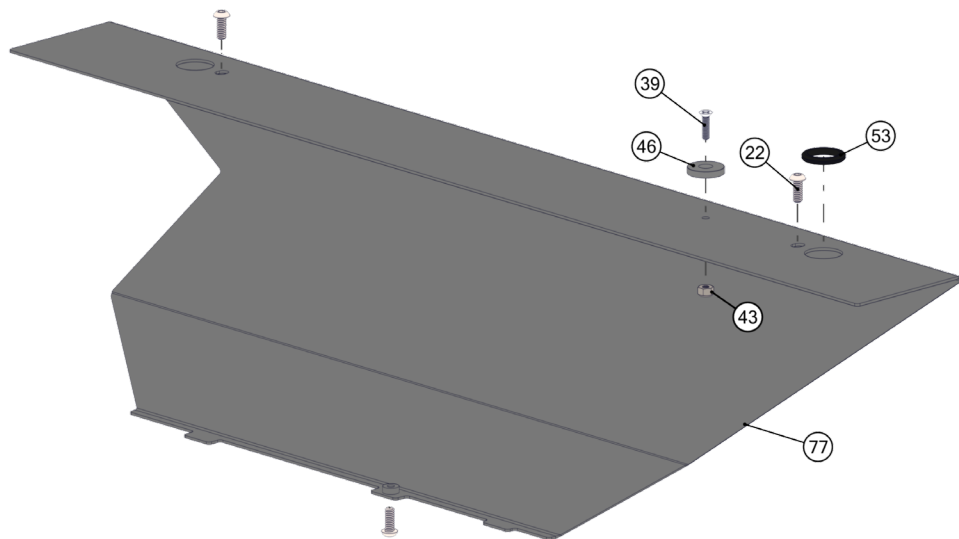
CODE	DESCRIPTION	PRT #	QTY
52	3/4" ID X 1/8" GROOVE RUBBER GROMMET	HRG-750123-013	3
53	7/8" ID X 1/16" GROOVE RUBBER GROMMET	HRG-875100-063	2
54	1/4" ID X 3/4" OD SEALING WASHER	HSL-250750-800-ZR	2
55	#6-32 MF X 3/8" LENGTH X 3/16" STAND OFF	HSO-0632-038	4
56	1/2" SHAFT EXTERNAL RETAINING RING	HSR-50002-EXT	4
57	#8 X 1/4" X 1" ALUMINUM SPACER	HSW-080250-100ZN	4
58	1/4"-20 X 5/16" STANDARD TEE NUT	HTN-25020-313-BP	2
59	1/4" ID X 3/4" OD X .060 FALT WASHER ZINC	HWS-250750-060ZN	10
60	4"-18LB ZIP TIE(SMALL TIE)	HZT-0625-040	28
61	RECON CLAMP SHAFT-FLATS	RCP-7033-011F	1
62	RECON BATTERY SIDE BRACKET LEFT	RCP-7232-302	1
63	RECON BATTERY SIDE BRACKET RIGHT	RCP-7232-303	1

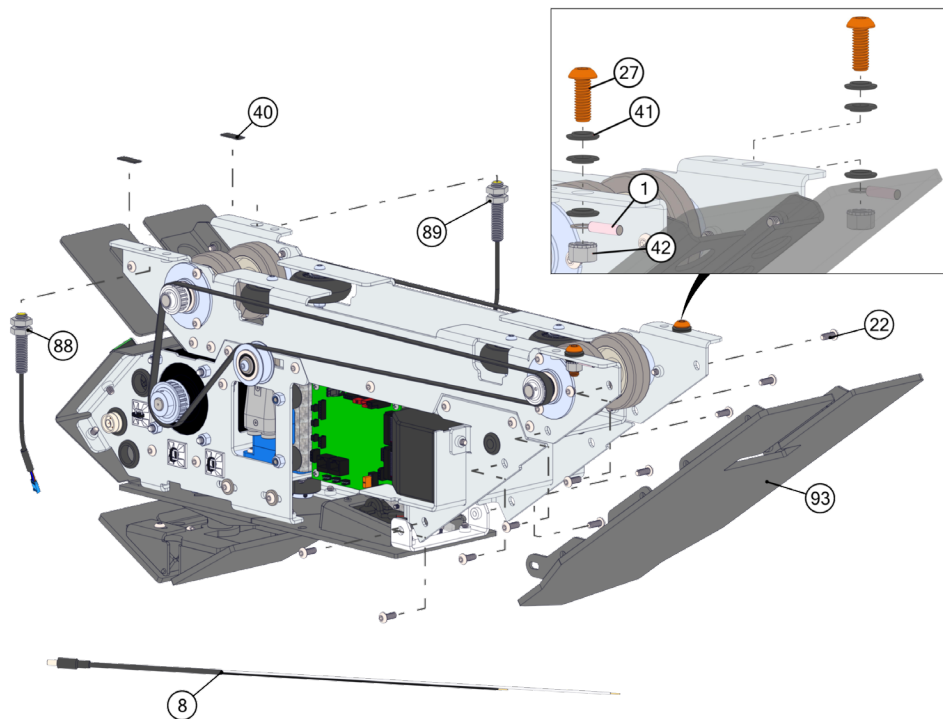
CODE	DESCRIPTION	PRT #	QTY
64	RECON BATTERY BASE BRACKET	RCP-7321-301	1
65	RECON ELECTRICAL MOUNTING BRACKET	RCP-7325-055	1
66	RECON TROLLEY BASE TRAY	RCP-7325-101	1
67	RECON TROLLEY SIDE BRACKET	RCP-7325-102	2
68	RECON WHEEL HUB HOUSING	RCP-7325-111	4
69	RECON TENSIONER PULLEY	RCP-7325-171	2
70	RECON TENSIONER SHAFT	RCP-7325-172	2
71	RECON BEARING TOP BRACKET	RCP-7325-203	1
72	RECON SLIDING MOTOR MOUNT	RCP-7325-206	1
73	RECON DRIVE MOTOR BRACKET-LEFT	RCP-7325-281	1
74	RECON DRIVE MOTOR BRACKET-RIGHT	RCP-7325-282	1
75	RECON REAR COVER	RCP-7325-283	1
76	RECON SIDE COVER-LEFT	RCP-7325-511	1

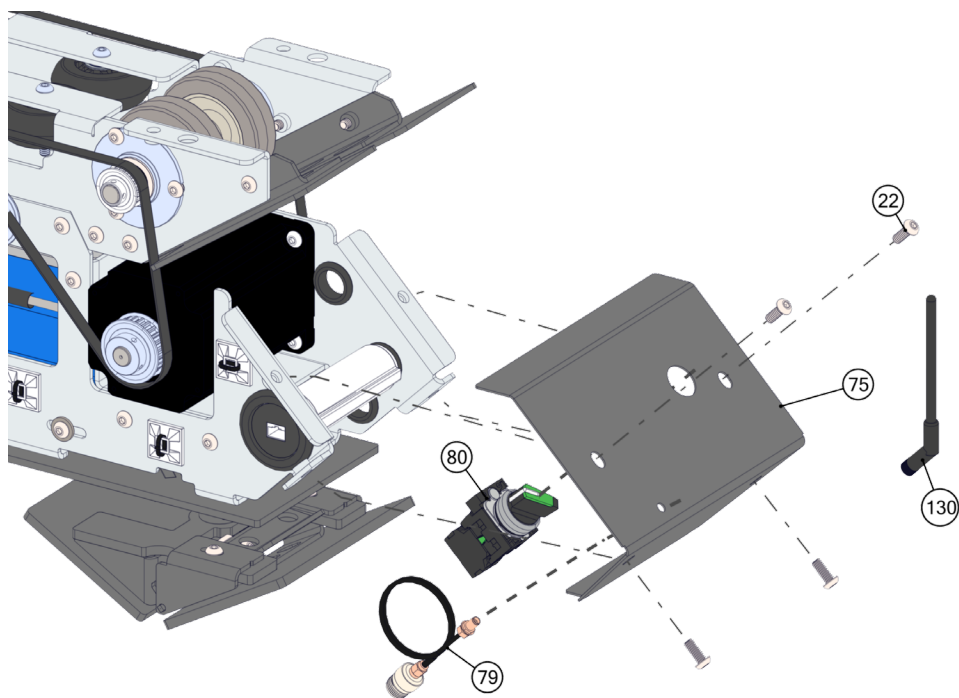
CODE	DESCRIPTION	PRT #	QTY
76	RECON SIDE COVER-RIGHT	RCP-7325-512	1
77	RECON LED MOUNT SADDLE	RCP-7325-613	1
79	RECON ANTENNA CABLE ASSEMBLY	ELA-8288-000	1
80	**TARGETRY 24V-240V POWER SWITCH	ELE-SWCH-240	1
81	RECON DRIVE WHEEL ASSEMBLY	RCD-625100-300	4
82	**RECON PCB ASSEMBLY	RCE-8186-118	1
83	RECON CLAMP HOMING SENSOR-20IN	RCE-CPRX-200	1
84	**RECON PLC ASSEMBLY	RCE-FX5UC-032	1
85	RECON BLUE LED LIGHT ASSEMBLY	RCE-LED-BLU	1
86	RECON RED LED LIGHT ASSEMBLY	RCE-LED-RED	1
87	RECON WHITE LED LIGHT ASSEMBLY	RCE-LED-WHT	1
88	RECON NEAR HOME PROX SENSOR-23IN	RCE-PROX-230	1
89	**RECON HOME PROX SENSOR- 27.5IN	RCE-PROX-275	1

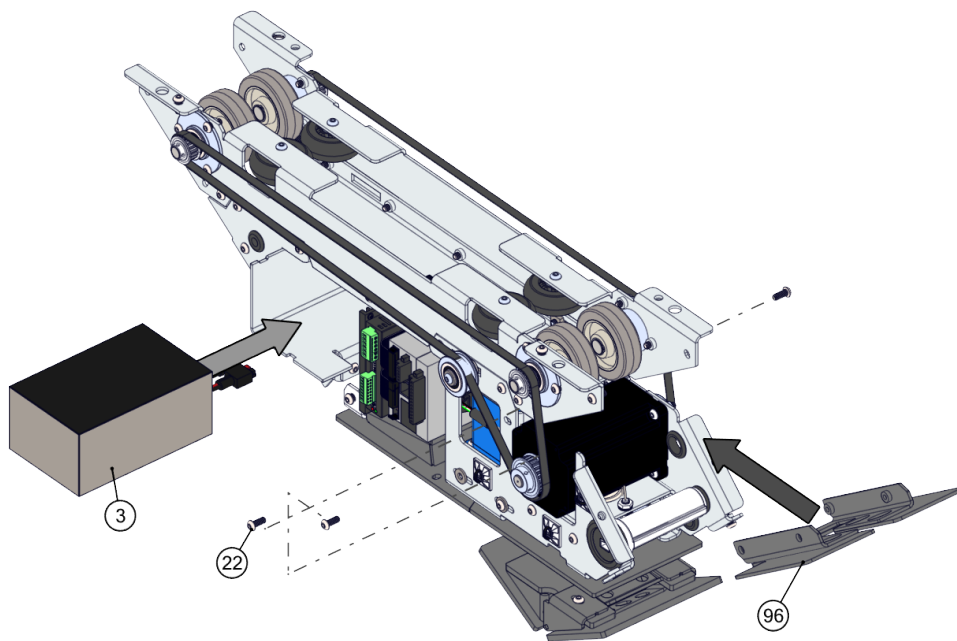
CODE	DESCRIPTION	PRT #	QTY
90	RECON RIBBON CABLE ASSEMBLY	RCE-RNBW-080	2
91	**RECON DRIVE MOTOR ASSEMBLY	RCM-34500-DBBL	1
92	RECON BLADE WHEEL ASSEMBLY	WHA-7010-001	4
93	RECON BALLISTIC WELDMENT***	RCW-7300-200	1
94	RECON CLAMP DEFLECTOR WELDMENT	RCW-7300-201	1
95	RECON LED BASE WELDMENT	RCW-7300-202	1
96	RECON TAIL STOP WELDMENT	RCW-7300-203	1
97	**RECON/STRYKER CLAMP ASSEMBLY***	RSA-7533-100	1
98	1/2" X3/4"X 1/2" FLANGE BUSHING -BZ	HFB-500750-500	1
99	1/2" SHAFT LOCK COLLAR	HLC-500125-406	1
100	1/2" L050 LOVEJOY - NO KEYWAY	HLJ-050	2
101	L050 LOVEJOY RUBBER SPIDER	HLJ-DAMP	1
102	RECON EXTENDED CLAMP DEFLECTOR	RCW-7325-600	1

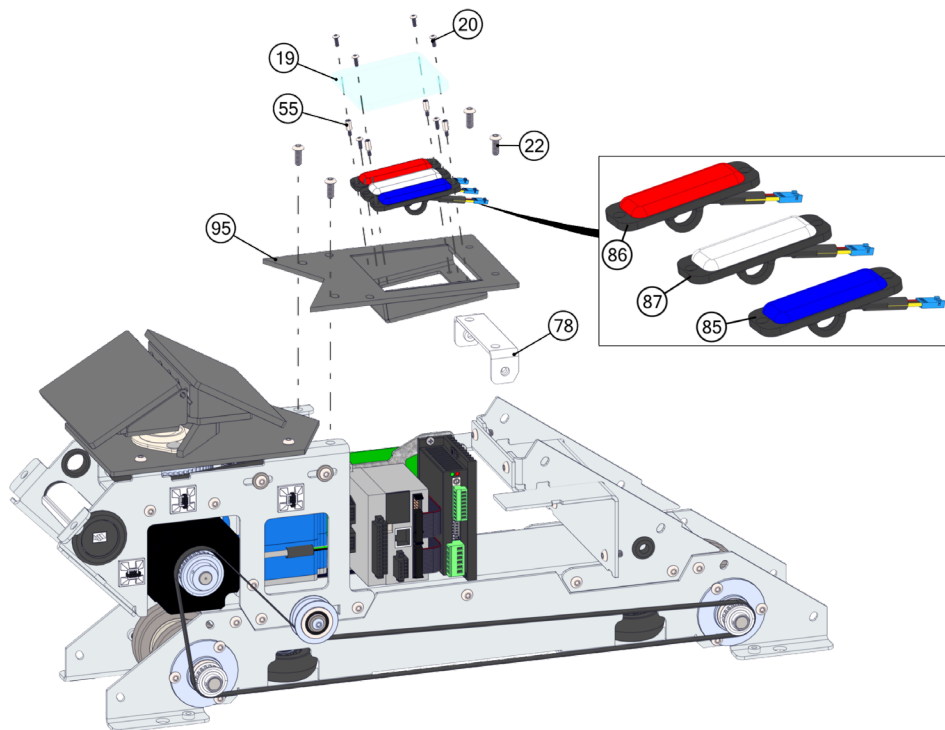


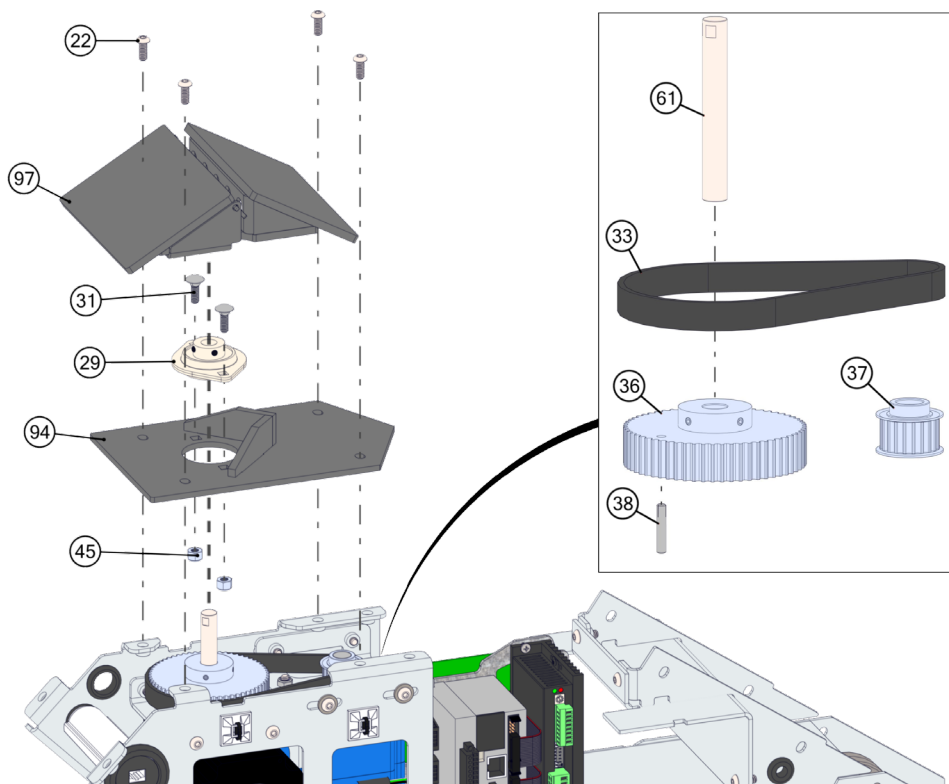


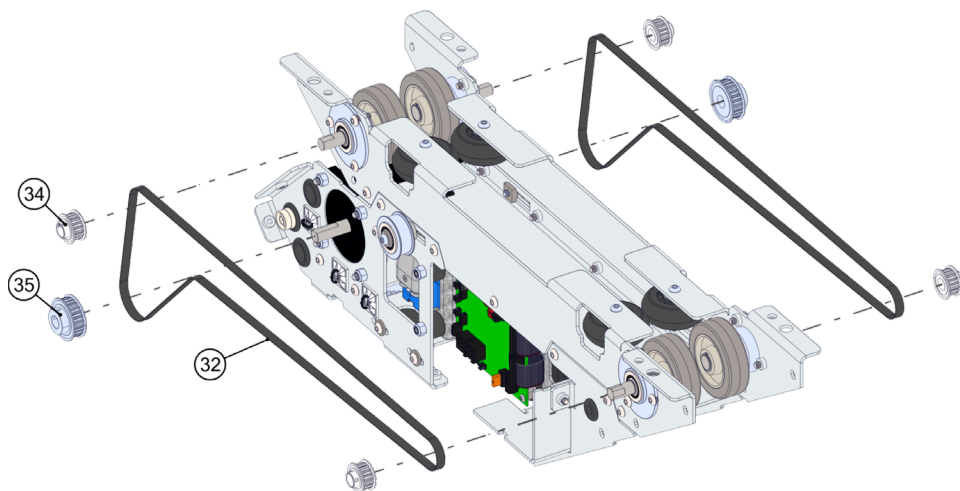


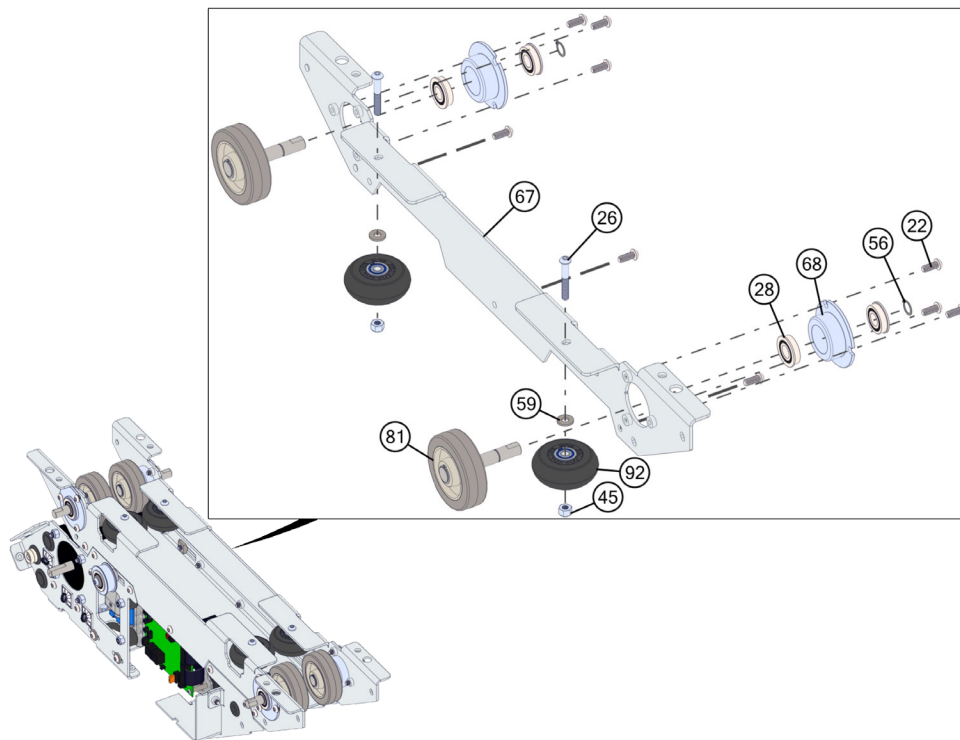


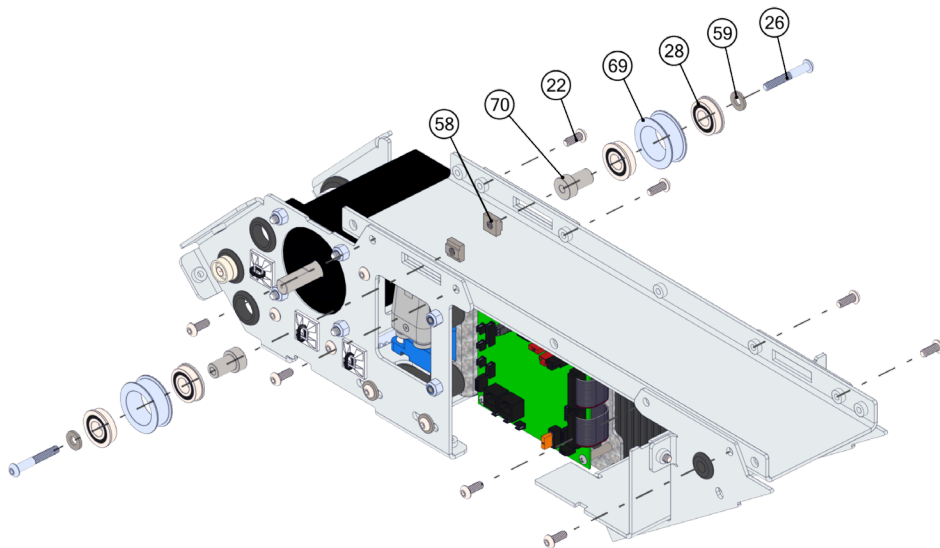


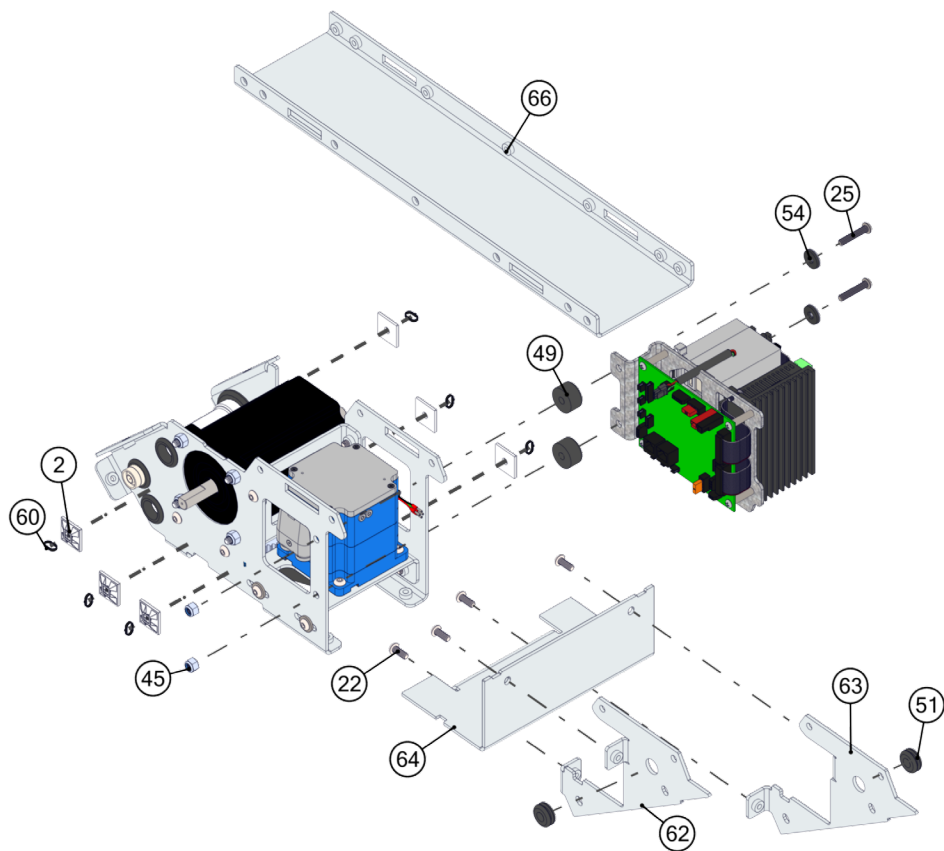


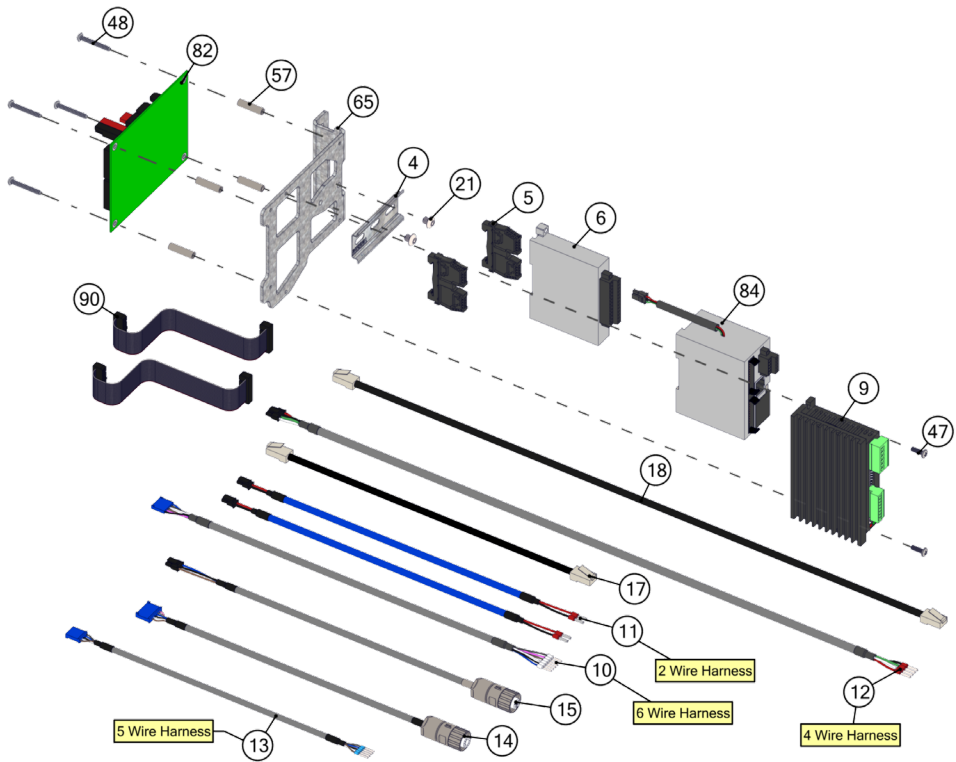


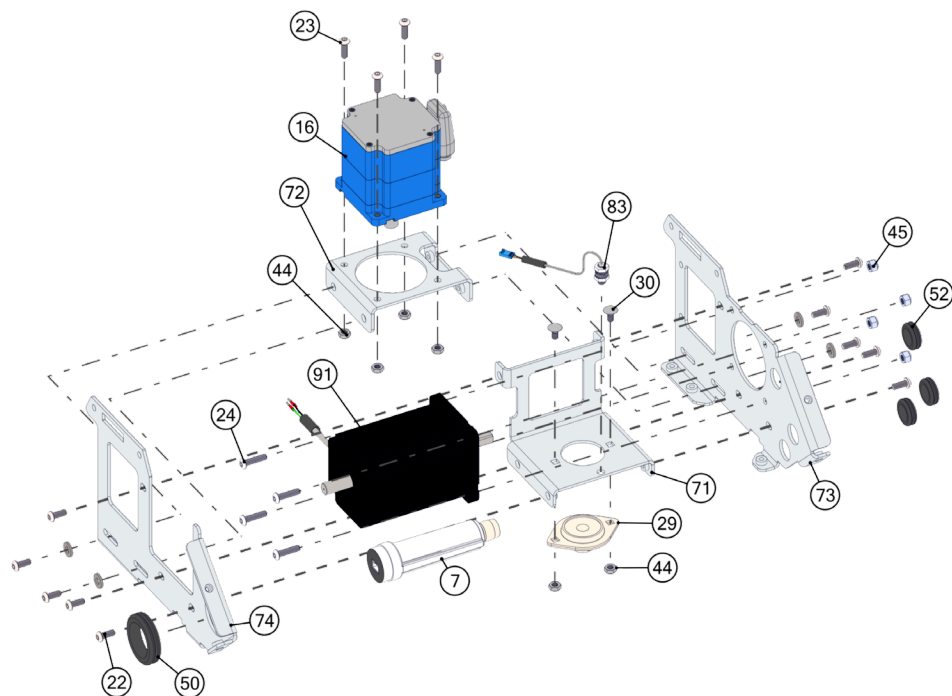


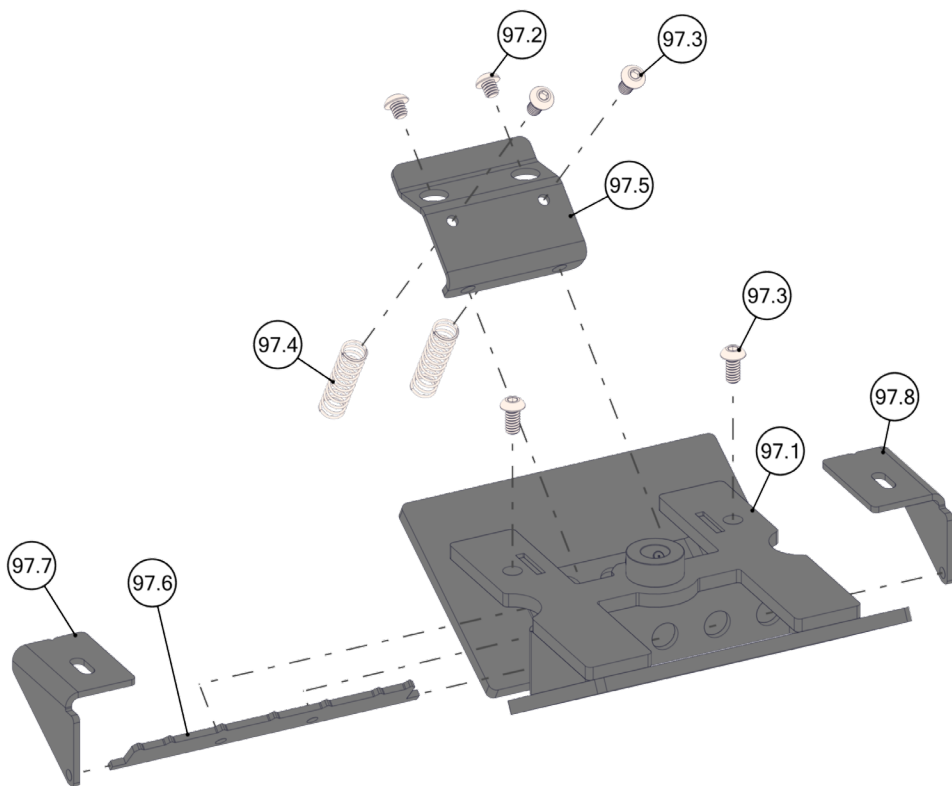




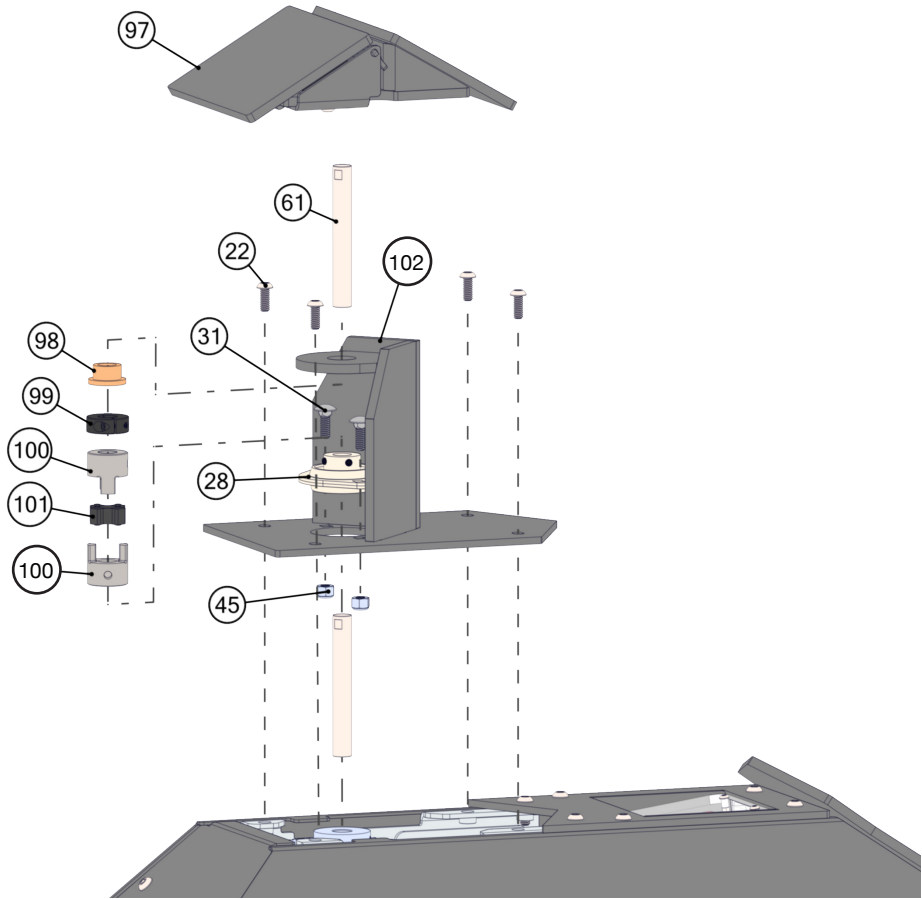








DISCONTINUED DOWNRIGGER CLAMP MODEL

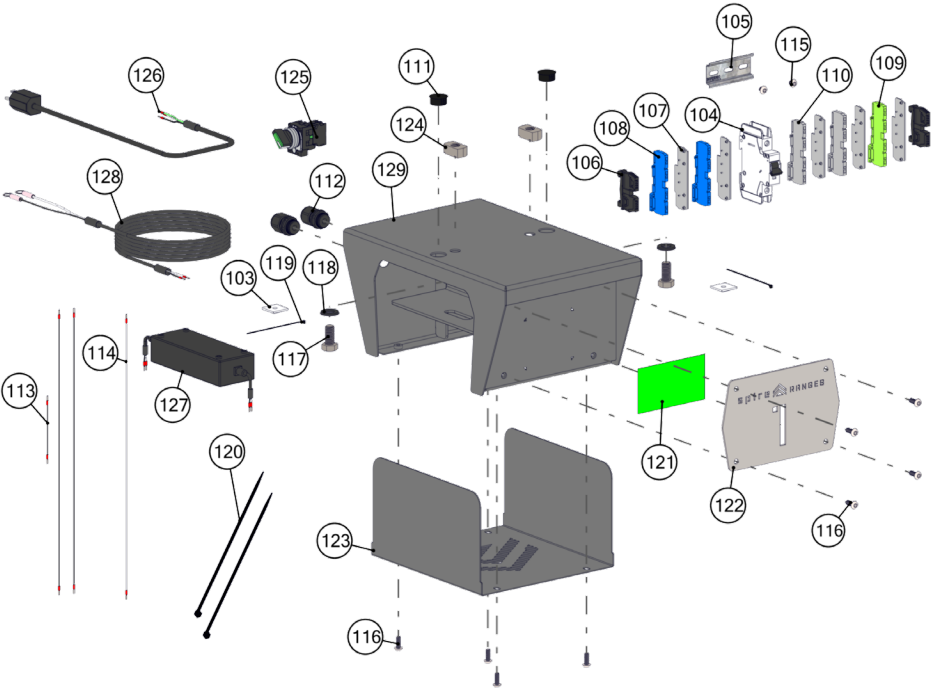


SPECIFICATIONS

Battery/Charger Voltage	24 VDC
Battery Cycle Count	2000 Cycles
Amp	10 A
Charge Box Circuit Protection	15 A
Carrier Length x Width x Height	33 x 7.75 x 13.75 in (838.2 x 196.85 x 349.25 mm)
Carrier Weight	70 lbs (31.75 kg)
Operating Temperature	10–26° C (50–80° F)
Storage Temperature	10–26° C (50–80° F)

CODE	SET SCREW NUMBER
A	HDG-050-5M09-019 #8-32 SS 5/64" HEX
B	HDG-050-5M09-025 #10-24 SS 3/32" HEX
C	HBR-SFL205-008 #10-32 SS 3/32" HEX
D	HDG-050-5M15-060 #10-32 SS 3/32" HEX
E	HLC-05000-044 1/4"-20 SS 1/8" HEX

RECON CHARGE UNIT



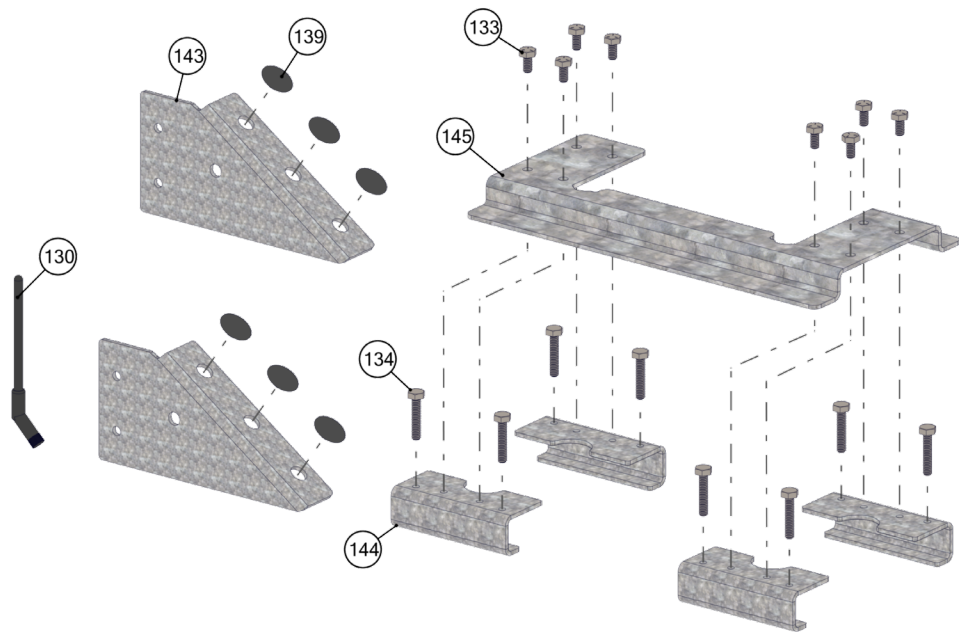
CODE	DESCRIPTION	PRT #	QTY
103	1"X1" NYLON WIRE TIE MOUNT	ELE-1010-WTM	2
104	5A 1 POLE CIRCUIT BREAKER- DIN RAIL MNT	ELE-2021-010	1
105	35MM DIN RAIL X 3"	ELE-3001-030	1
106	TERMINAL BLOCK END STOP	ELE-3012-101	2
107	TERMINAL BLOCK END X4-GREY	ELE-3012-220	5
108	TERMINAL BLOCK X4- BLUE	ELE-3014-BLU	2
109	TERMINAL BLOCK X4 GROUND- GRN/YLW	ELE-3014- GRN-YEL	1
110	TERMINAL BLOCK X4- GRAY	ELE-3014-GRY	2
111	7/8" PANEL HOLE PLUG	ELE-4001-088	2
112	3/8" NPT X 5-10 CABLE GLAND	ELE-4002-038	2
113	18 GA STRANDED WIRE-BLACK	ELEWR-BLK-18	3
114	18 GA STRANDED WIRE-WHITE	ELEWR-WHT-18	1

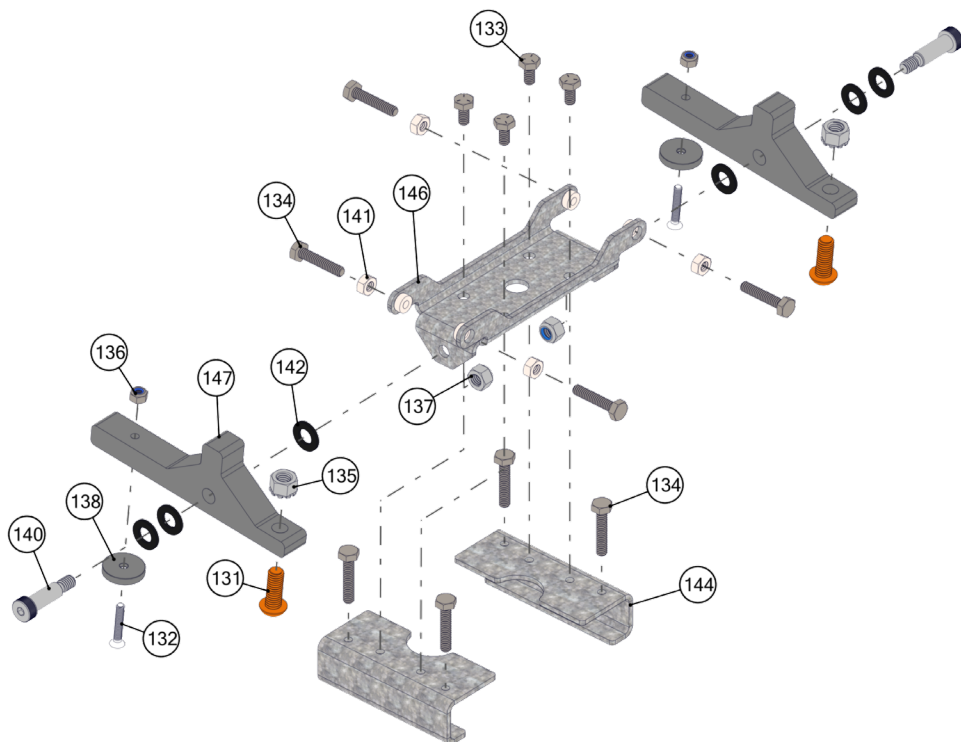
** Indicates recommended replacement parts. (See p. 120 for more information)

*** Indicated parts that are consumables and are not covered under the warranty agreement. In addition, any misuse, lack of maintenance, and/or modifications made to any Spire products will void all warranties.

CODE	DESCRIPTION	PRT #	QTY
115	1/4"-20 X 1/4" BUTTON HEAD SCREW-SS	HBH-25020-025-SS	2
116	**1/4"-20 X 5/8" BUTTON HEAD SCREW-SS	HBH-25020-063-SS	8
117	1/2"-13 X 1" HEX BOLT-ZN	HHB-50013-100-ZN	2
118	1/2" X 1" X .100 SEALING WASHER	HSL-500100-100ZR	2
119	4"-18LB ZIP TIE (SMALL TIE)	HZT-0625-040	2
120	12"-40LB ZIP TIE (LARGE TIE)	HZT-188-120	2
121	LANE NUMBER BACKING DECAL	LNP-7031-201	1
122	LANE PLATE	LNP-7000-001	1
123	RECON CHARGE ENCLOSURE COVER	RCP-7325-715	1
124	1/2" -13 CHANNEL STRUT NUT	USN-50013-001-ZN	2
125	**TARGETRY 24V-240V POWER SWITCH	ELE-SWCH-240	1
126	RECON CHARGE UNIT POWER CORD	RCE-5810-120	1
127	**LITHIUM CHARGER ASSEMBLY	RCE-6424-040A	1

CODE	DESCRIPTION	PRT #	QTY
128	RECON CHARGING CABLE ASSEMBLY	RCE-CHRG-182	1
129	RECON CHARGE ENCLOSURE WLDMNT	RCW-7325-210	1





CODE	DESCRIPTION	PRT #	QTY
130	4" ANTENNA	ELE-8042-400	1
131	3/8"-16 X 1" BRASS BUTTON HEAD	HBH-37516-100-BZ	2
132	#10-32 X 1" FLAT HEAD PHILIPS SCREW-ZN	HFH-1032-100-ZN	2
133	**1/4"-20 X 1/2" HEX BOLT-ZN	HHB-25020-050-ZN	13
134	1/4"-20 X 1-1/4" HEX BOLT-ZN	HHB-25020-125-ZN	16
135	3/8"-16 NUT W/ WASHER (KEPS)	HKN-37516-008-ZN	2
136	#10-32 NYLOCK NUT-ZN	HLN-01032-005-ZN	2
137	5/16"-18 NYLOCK NUT-ZN	HLN-31318-005-ZN	2
138	1" X #10 X 3/16" NEODYMIUM DISC MAGNET	HMG-10010-18842S	2
139	1/2" X 1" X 1-1/4" DISC BUMPER	HRB-50098-012	6
140	3/8" DIA. X 1" SHAFT X 5/16"-18 SHLDR BOLT	HSB-375100-31318	2
141	1/4"-20 HEX NUT-SS	HSN-25020-005-SS	4

** Indicates recommended replacement parts. (See p. 120 for more information)

*** Indicated parts that are consumables and are not covered under the warranty agreement. In addition, any misuse, lack of maintenance, and/or modifications made to any Spire products will void all warranties.

CODE	DESCRIPTION	PRT #	QTY
142	.375 X .75 X .063 BLACK NYLON WASHER	HWS-375750-063NY	6
143	**RECON/URBAN END STOP BRACKET-LEFT	TKP-7040-151	2
144	TRACK SPLIT HANGER BRACKET	TKP-7040-172	6
145	RECON HOMING BRACKET	TKP-7040-181	1
146	RECON CHARGING CONTACT BRACKET	TKP-7326-931	1
147	RECON CHARGING PIVOT BLOCK	TKP-7326-932	2

MAINTENANCE:

ROUTINE MAINTENANCE

TIME TABLE	PROCEDURE
Weekly	1. Check each set screw (see p. 89) to ensure they have remained tight. 2. Clean out spent casings that may have travelled into the covers of the carrier and clamp assembly. 3. Check both proximity sensors on the top of the carrier to ensure they are snug and haven't moved up or down. 4. Check clamp sensor inside the carrier to ensure it is snug and hasn't moved up or down. 5. Lightly twist clamp with carrier turned on to ensure there is no movement or slip of the clamp to the shaft.
Monthly	1. Check the condition of each wheel and belt. 2. Check the wheel alignment. 3. Check the track screws on the charging bracket to ensure they are tight to the track. 4. Tighten all the bolts/nuts on the track and track hangers. 5. Fully charge any spare batteries.
Biennially	1. Check that the batteries are maintaining their desired level of charge. Batteries are rated for 2000 cycles. The average range will hit ~2000 cycles every 2 years. After 2 years it is expected that the batteries will have <80% their original capacity. 2. Replace the batteries if desired to keep within their cycle rating. (See p. 109.)

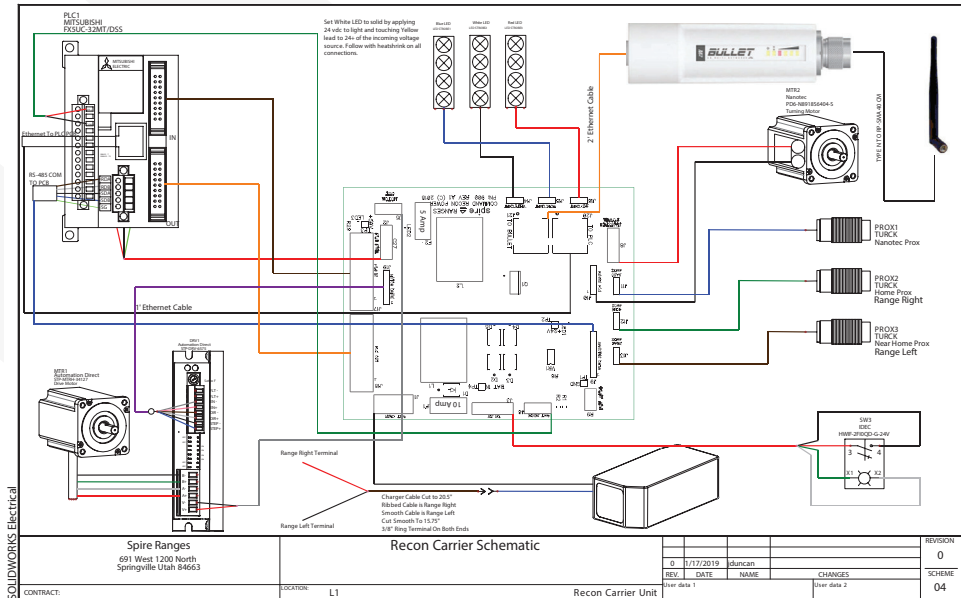
TOOLS

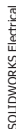
LIST OF TOOLS

- Snap Ring Pliers
- 5/64" Allen Wrench
- 3/32" Allen Wrench
- 3/32" Extended Allen Wrench
- 5/32" Allen Wrench
- 5/32" Extended Allen Wrench
- 1/8" Allen Wrench
- 1/8" Extended Allen Wrench
- 3/16" Allen Wrench
- 2mm Hex Wrench
- 5/16" Wrench x2
- 3/8" Wrench
- 7/16" Wrench
- 1/2" Wrench x2
- 3/4" Wrench x2
- 3/16" Socket
- 7/16" Socket
- Socket Wrench
- Low Strength Purple Thread Locker
- Medium Strength Blue Thread Locker
- 1/8" Flathead Screwdriver
- Mini Flathead Screwdriver
- #2 Phillips Screwdriver
- Standard Drill
- #2 Phillips Head Bit
- #1 Phillips Screwdriver
- Multimeter

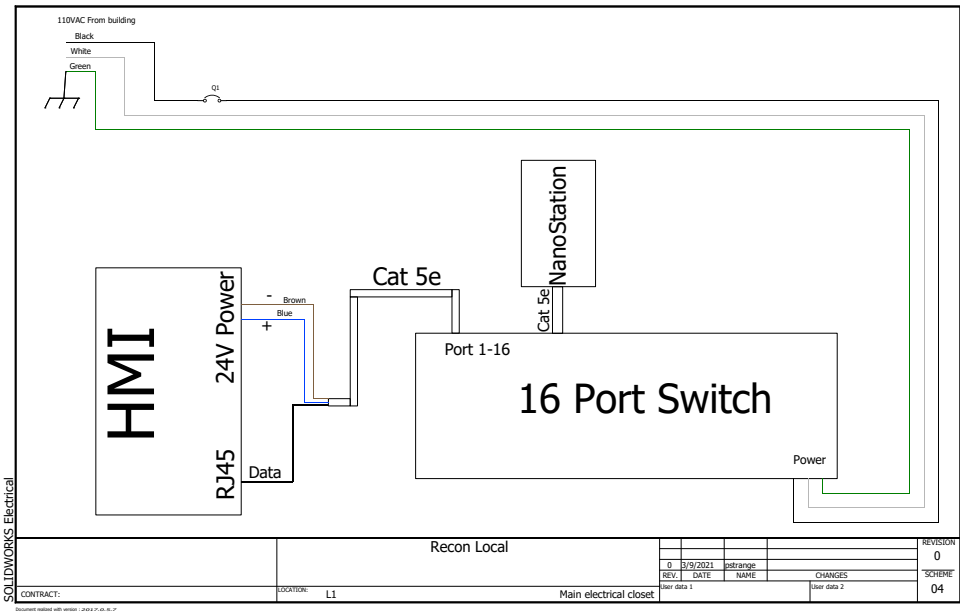
S C H E M A T I C S

RECON CARRIER SCHEMATIC

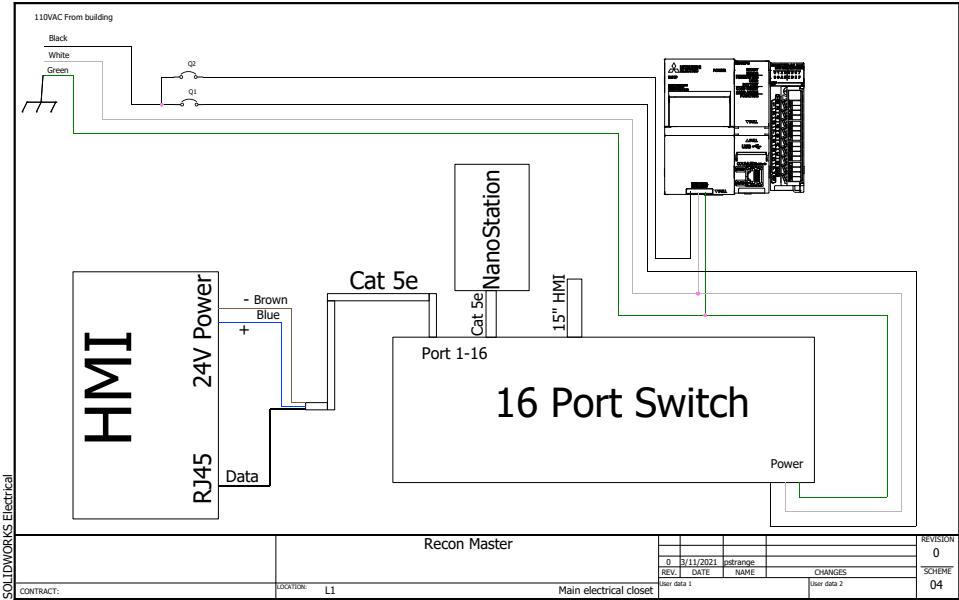




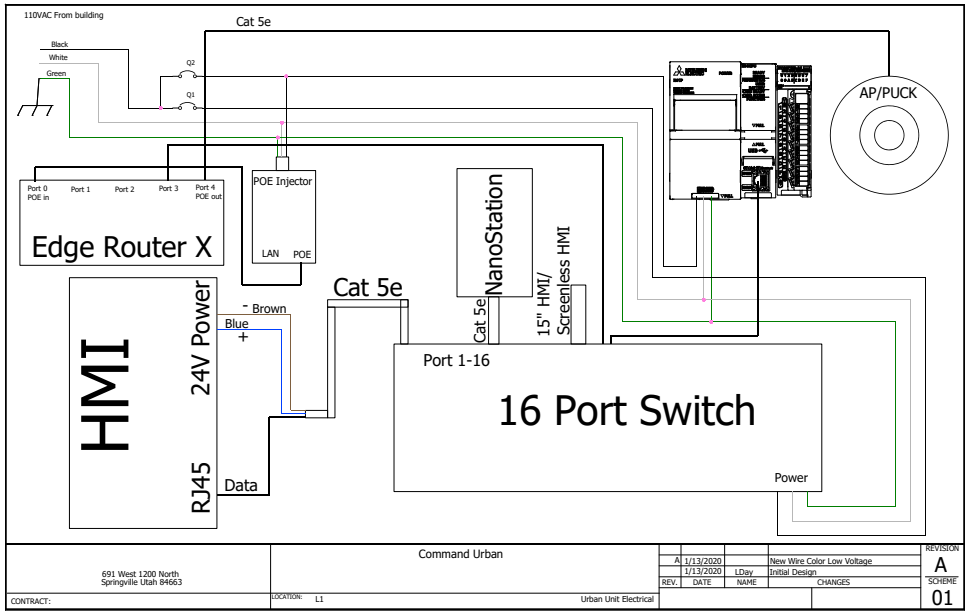
HMITOUCH SCREEN [LOCAL CONTROLS]



RECON MASTER PANEL

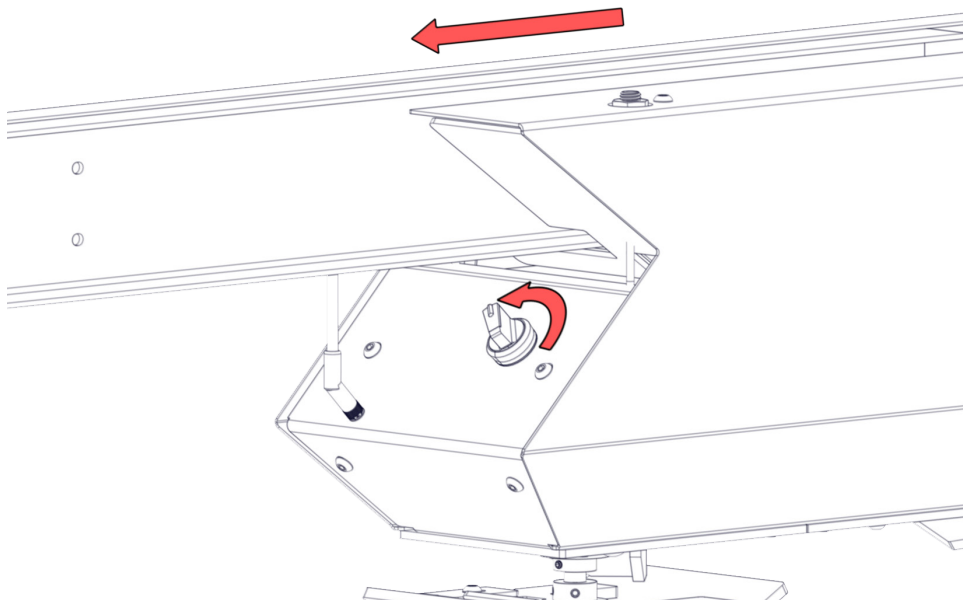


RECON MASTER PANEL (IPAD ADDITION)

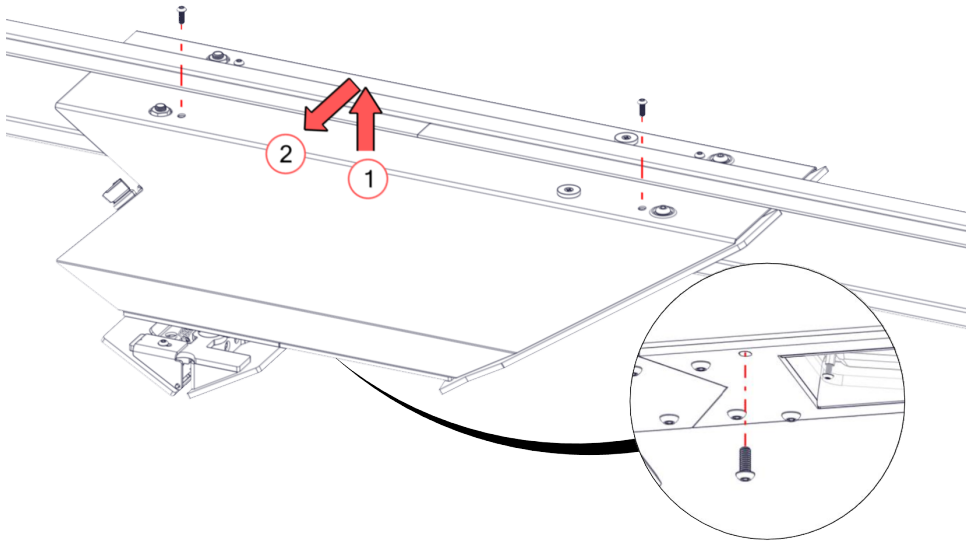


BATTERY REPLACEMENT PROCEDURE

Make sure range is clear before replacing the battery. The carrier will need to be pushed into the shooting area to access the battery without bumping into homing brackets and charging rocker arms overhead on the track.

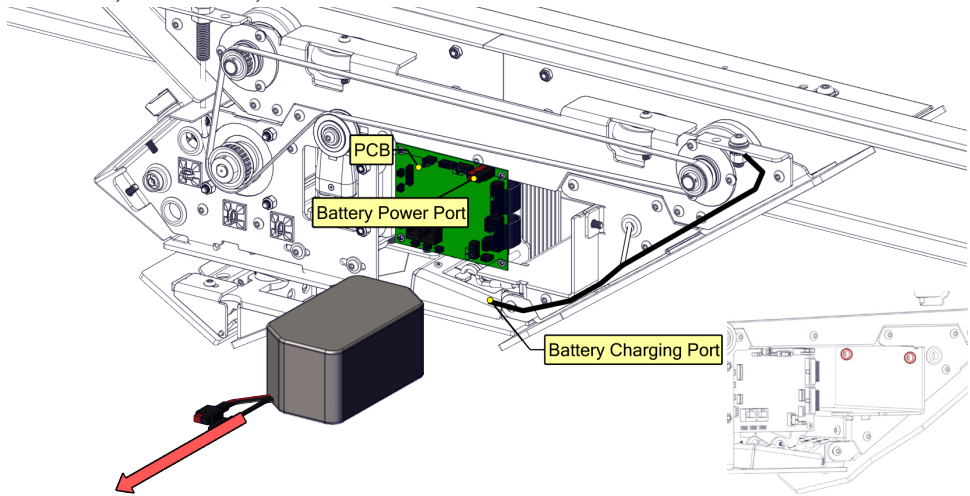


- [1] Locate the power switch on the back of the carrier unit and rotate it 90° counterclockwise.
- [2] Push the unit back on the track into the range until it has cleared the long homing bracket attached to the top of the track.



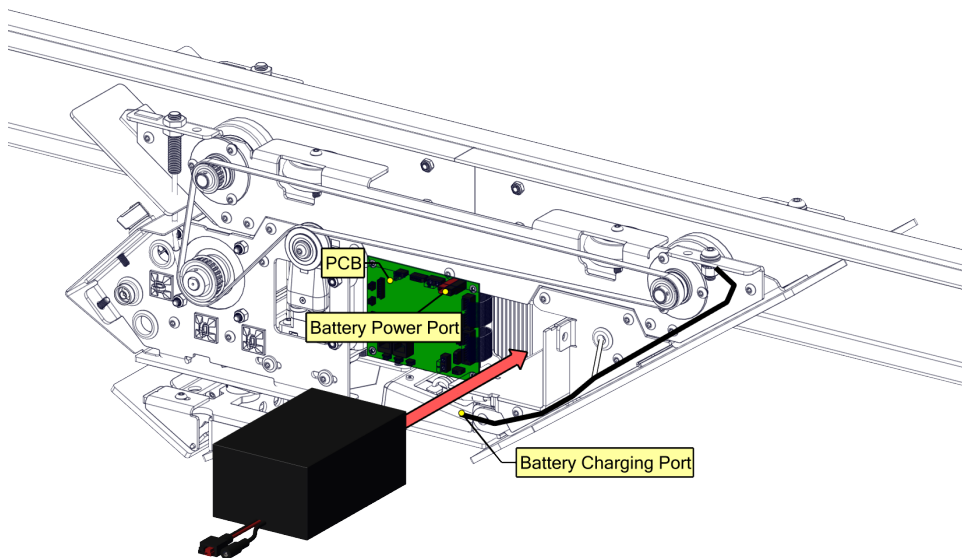
- [3] Remove the side panel on the shooter's left side by unscrewing the two screws on top of the unit, and then unscrewing the one underneath by the lights.
- [4] Lift the side cover up and slide off over the sensor and brass bolt

Warning: Discharge all personal static before handling any electronics within the targetry unit. Failure to do so may result in damage to the electrical components that is not covered by the warranty.



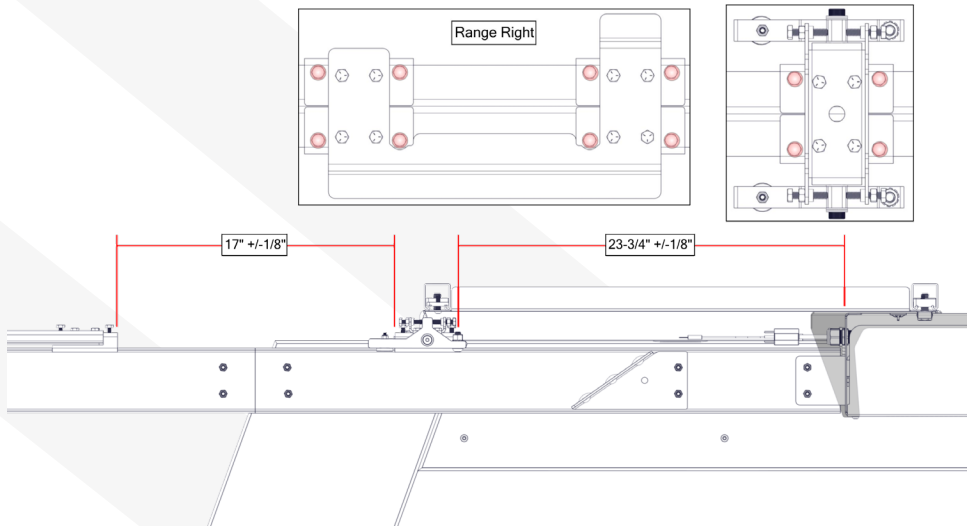
- [5] Unplug the battery from the circuit board's Battery Power Port (black & red connector).
- [6] Unplug the battery from the Battery Charging Port (cylindrical/barrel connector).
- [7] Pull the battery out of the carrier.
- [8] Remove the two, upper, button-head screws from the battery-seat bracket (unit is sturdy enough that removing those screws will not compromise the structure of the unit).

Note: New style of batteries are wider. Failure to remove the screws may result in damaging the battery.

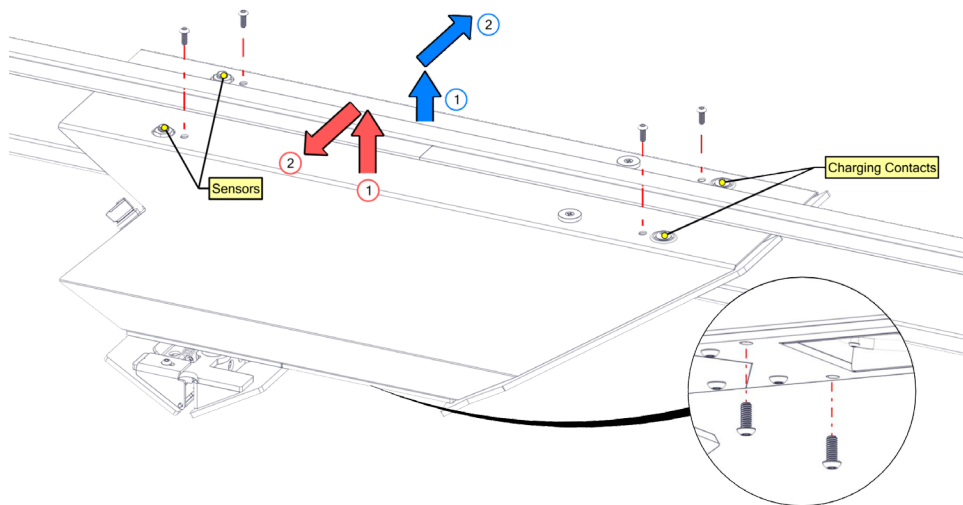


- [9] Insert the new battery into the carrier with the cables toward the side with the circuit board and down toward the base of the unit.
- [10] Plug the charging cord into the Battery Charging Port (cylindrical/barrel connector).
- [11] Plug the power cord into the circuit board's Battery Power Port (black & red connector).
- [12] Attach the left side cover back onto the carrier.
- [13] Turn the carrier back on.

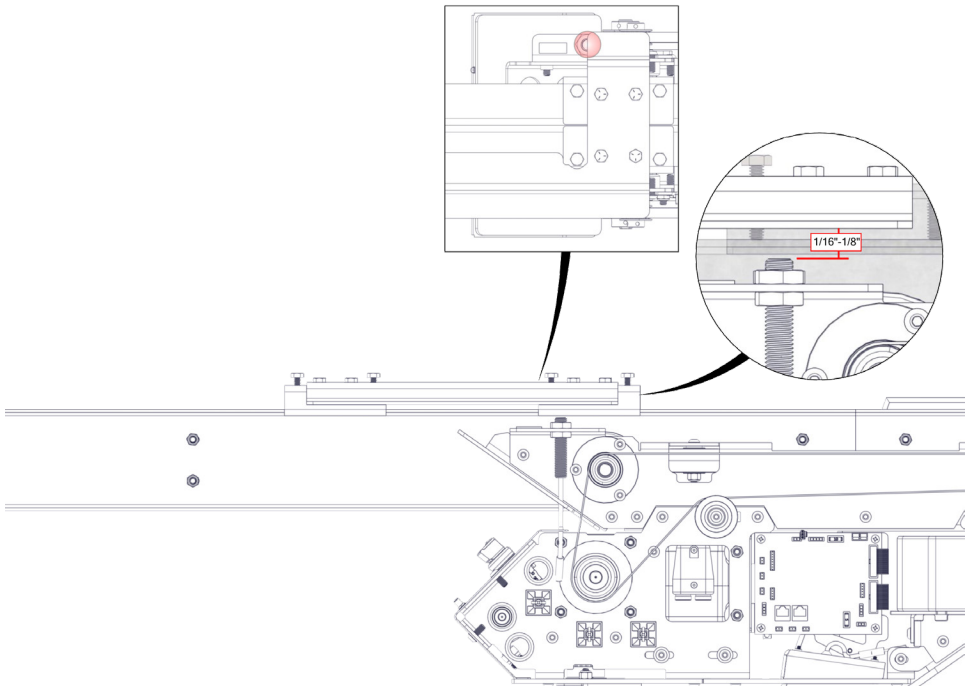
CHARGING BRACKET/SENSORS



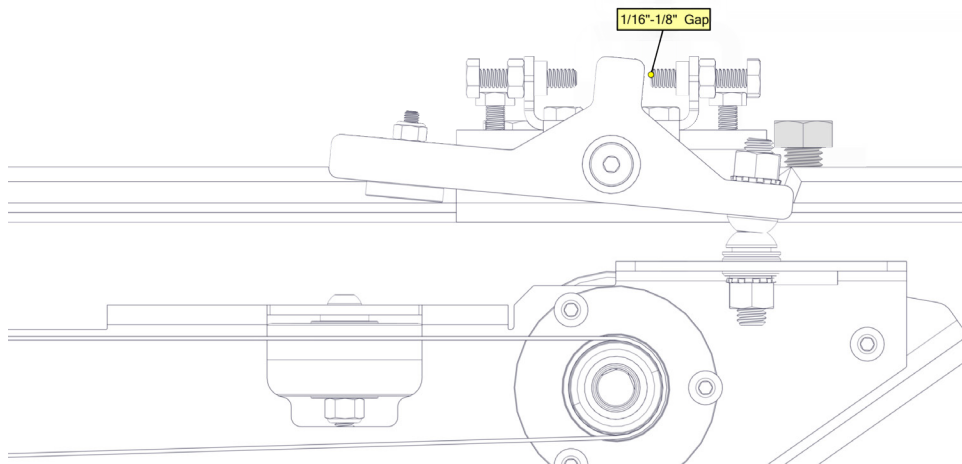
- [1]** Loosen all the 1-1/4" bolts on the bracket that needs repositioning (see highlighted bolts).
- [2]** Adjust the bracket distance based on the distances shown above.
- [3]** Ensure that the bracket is straight and that the charging lugs of the carrier align correctly when homed.
- [4]** Tighten all the 1-1/4" bolts against the track to secure in place (see highlighted bolts).



- [5] Remove the screws that hold on each side panel (two on top & one on bottom for each panel).
- [6] Lift the shooter's **left** side up and pull out & up & over the charging bolts and sensors.
- [7] Unplug the battery from the circuit board's Battery Power Port (black & red connector).
- [8] Unplug the battery from the Battery Charging Port (cylindrical/barrel connector).
- [9] Lift the shooter's **right** side up and pull out & up & over the charging bolts and sensors.



- [10] Push the carrier under the homing bracket until the sensor on range right is half covered by the short tab (this is the home position).
- [11] Loosen the nuts and adjust each sensor until there is a $1/16$ "- $1/8$ " gap between the top of the sensors and the bracket.
- [12] Tighten the nuts back down to secure in place.

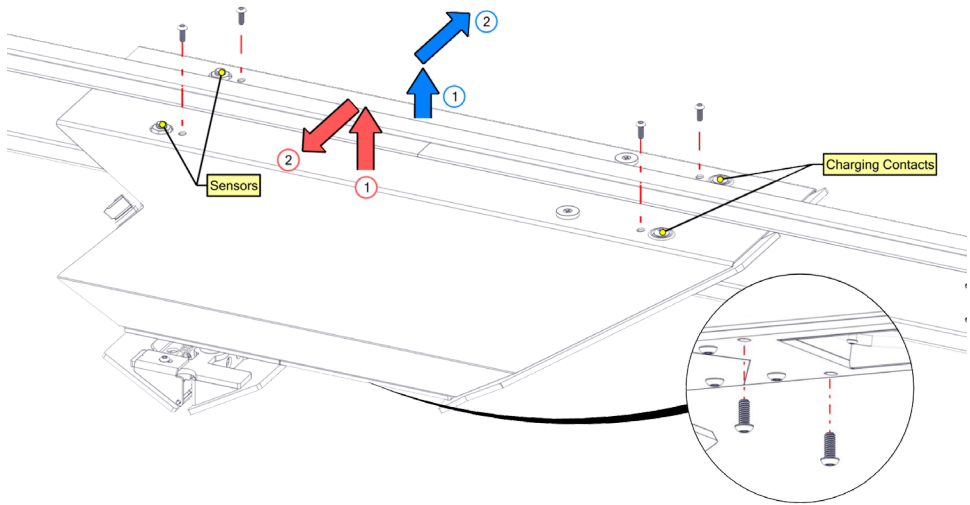


[13] Turn off power to the charge box

[14] With the still in the home position unthread the two screws on the front of the charging bracket until the brass bolts connect then keep unthreading until there is a 1/16"-1/8" between the bolts and pivot arms.

- Too small of a gap may prevent charging due to slight variances in homing and too large of a gap could have the bracket hit the carrier side panels and damage the charging unit.
- Note: With the covers off the magnets will not be repelled so the back end of the pivot arms will need to be manually lifted while adjusting the bolts.

[15] Thread the two jam nuts against the bracket and tighten down to secure both bolts in place.



- [16] Replace the shooter's **right** side panel (make sure the charging bolts and sensors are not covered by the panel).
- [17] Plug the battery into the Battery Charging Port (cylindrical/barrel connector).
- [18] Plug the battery into the circuit board's Battery Power Port (black & red connector).
- [19] Replace the shooter's **left** side panel (make sure the charging bolts and sensors are not covered by the panel).
- [20] Replace the screws that hold on each side panel (two on top & one on bottom for each panel).

RECOMMENDED REPLACEMENT PARTS

DESCRIPTION	PRT #	QTY
RECON BOARD	RCE-8186-118	1
CLAMP HOMING SENSOR	RCE-CPRX-200	1
HOME SENSOR	RCE-PROX-275	2
CLAMP	RSA-7533-100	1
TRACK END STOP	TKA-7040-151	2
DRIVE MOTOR	RCM-34500-DBBL	1
CLAMP MOTOR	ESM-3414-PD6S	1
DRIVE MOTOR DRIVER	ELE-76575-257	1
DRIVE BELT	HDB-5M09-1295	2
CLAMP BELT	HDB-5M15-425	1
SELECTOR SWITCH	ELE-SWCH-240	2
CHARGER	RCE-6424-040A	1

*** Indicates parts that will need to be programmed for a specific lane. It is recommended for them to be purchased and to remain on Spire shelves where they can be programmed to a specific lane as needed.

DESCRIPTION	PRT #	QTY
TRACK HANGER ASSEMBLY	TKA-7040-SRI	2
BATTERY	ELE-2410-004	2
LEXAN LIGHT COVER	FBP-7072-202	1
***LOCAL 7" HMI	ELE-65070-CBK	1
***PLC	ELE-6005-532	1
***WIRELESS BULLET	ELE-6138-200	1
HARDWARE REPLACEMENT KIT (Below items are included in kit)	RECON-HARDWARE-KIT	1
CLAMP SET SCREW	HSS-25020-038-SS	10
CLAMP BEARING SET SCREW	HSS-01032-019-BK	10
CLAMP MOTOR GEAR SET SCREW	HSS-04M07-004-BK	10
CLAMP SHAFT GEAR SET SCREW	HSS-01032-025-BK	10
DRIVE MOTOR GEAR SET SCREW	HSS-01024-025-BK	10
DRIVE WHEEL GEAR SET SCREW	HSS-0823-013-BK	10

DESCRIPTION	PRT #	QTY
BUTTON HEADS	HBH-25020-063-SS	15
TRACK BOLT	HHB-25020-050-ZN	20
TRACK NUT	HLN-25020-001-ZN	25
TRACK BRACKET BOLT	HHB-25020-100-ZN	5

SERVICE PLANS:

OVERVIEW

At the core of Spire Ranges is our commitment to keep our installed equipment in each range running at its optimum performance. To maintain that standard, below is a list of the different service package levels available to our clients. We look forward to providing your range with a quote that is unique to your range.

LEVEL	TRIPS PER YEAR	PARTS DISCOUNT
Bronze	1	0%
Silver	2	5%
Gold	4	10%

SERVICES OFFERED WITH EACH SITE VISIT:

- Provided Refresher Training
- Software Update/Reconfiguration
- Test all Motors, Valves, Cylinders, Lights, & Proximity Switches
- Target Clamp Inspection/Adjustment
- Check/Secure Electrical Connections
- Verify Proper Voltages
- Verify Controller(s) (HMI/Computer) Functionality
- Assess Cable Tension & Adjust
- Assess Track Health & Tighten/Replace any Loose/Missing Hardware
- Verify Proper Charging of Targets
- Stall/Bench Inspection
- Trap Inspection
- Overall Range Health Inspection

TROUBLESHOOTING:

Given below are possible causes and solutions for system problems. Within this section, you will find sequential steps that can be used to help troubleshoot a problem. If a problem persists after following these troubleshooting guidelines, please contact the Spire support team.

1.0 HMI TOUCH SCREENS (MASTER & LOCAL)

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
1.1 Dark Blank Screen	(1) Screen is in sleep mode	(1) Touch the screen to bring HMI out of sleep mode.
	(2) No power supplied to HMI	(1) Check the power supply connection. (2) If the 15" master, check the fuse on the back of the screen. (3) Check circuit breaker to see if tripped. (4) If problem persists, contact Spire for technical support.
1.2 Single Nonresponsive Button on Screen	(1) HMI screen error	(1) Check power supply to PLC. If PLC has power, cycle power to PLC. (2) If there is no indicator light for power to the PLC, check circuit breaker to see if tripped.
	(2) HMI calibration needed	(1) Power cycle the screen and (2) immediately touch the screen during startup. (3) Follow the on-screen prompts to calibrate.
	(3) HMI / PLC fault	(1) Contact Spire for technical support.
1.3 Entire HMI Touch Screen Nonresponsive	(1) HMI error	(1) Cycle power to HMI. (2) Cycle power to the PLC.
	(2) HMI / PLC fault	(1) Contact Spire for technical support.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
1.4 Communication error for single lane	(1) Dead carrier battery	(1) Return carrier to home and check LED in overhead unit (charge box). (See Charge Box LED Status section.)
		
	(2) Ethernet (RJ45) cable unplugged or damaged	(1) Check all RJ45 connections in control panel. (2) Check RJ45 connection to screen. (3) Follow cable up the stalls to ensure they are not smashed or damaged.
		
	(3) Bad antenna	(1) Inspect the antenna for damage. (2) Ensure the antenna has positioned so they have minimal line-of-site of the Nanostation.
1.5 Communication error for entire bay		
	(4) Bullet error	(1) Turn carrier power on. (2) Wait 3-5 min. (3) Check bullet for indication lights. (See Bullet Troubleshooting section.)
		
	(5) Nanostation error	(1) Cycle power to the entire range.
		
1.5 Communication error for entire bay	(1) Ethernet (RJ45) cable unplugged or damaged	(1) Check all RJ45 connections in control panel. (2) Check RJ45 connection to Nanostation.
		
	(2) Nanostation error	(1) Cycle Nanostation power (unplug and replug ethernet cable). (2) Wait 3-5 min. (3) Check nanostation for indication lights. (See Nanostation Troubleshooting section.)
		
	(3) Ethernet switch off	(1) Check ethernet switch for power. (2) Check circuit breaker.
1.5 Communication error for entire bay		
	(4) Ethernet switch error	(1) Check POE status light for port that Nanostation is using. (2) Swap ethernet cable to another passive POE enabled port.

2.0 RECON TARGET UNITS

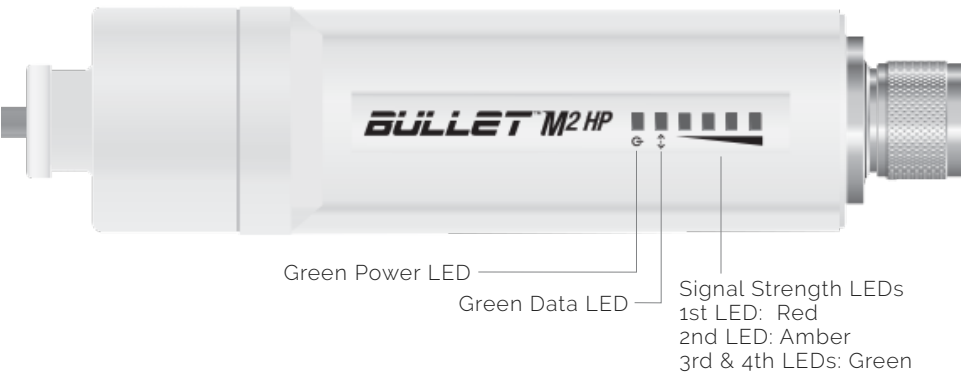
PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
2.0 Clamp Continues to Rotate After Turning Carrier On (Continuing to Calibrate)	(1) Loose sensor/sensor height changed	(1) Remove backplate with switch from the carrier. (2) Make sure there is a minimal gap between sensors and gears. (3) Sensor will light up when it detects metal and clamp will stop spinning.
	(2) Sensor damaged (not lighting up)/bad wire connections	(1) Check connection on carrier circuit board. (2) Check sensor for damage. (3) If problem persists, contact Spire.
2.1 Misaligned Target	(1) Alignment error	(1) Navigate to the Operation Screen on the HMI Touch Screen (refer to main menu on page 26). (2) Select home to recalibrate.
	(2) Drive coupling malfunction	(1) Check for drive coupling separation. (2) If yes, re-seat both metal couplings into the rubber spider so they are tight against each other and re-tighten both set screws with low-strength Loctite.
	(3) Proximity sensor	(1) See problem 2.0.
2.2 Nonresponsive Target Turner (Not Moving)	(1) Obstruction in drive system	(1) Power off targets. (2) Turn target manually by hand to see if it turns. (3) If it doesn't turn, check backside of downrigger for obstruction. (4) Check inside of clamp for obstructions. (5) Remove obstructions if present.
	(2) Disconnected motor cable	(1) Check target turner motor cables.
	(3) Turning motor fault	(1) Contact Spire for technical support.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
2.3 Target Turner Scraping/"Faulting Out" When Rotating	(1) Clamp teeth adjusted too far open	(1) Adjust the clamp teeth to be closer to the clamp center. (2) Teeth should be close enough to barely allow the target/target backer to slide in.
2.4 Target Falling Out When Rotating	(1) Clamp teeth adjusted too far open	(1) Adjust the clamp teeth to be closer to the clamp center. (2) Teeth should be close enough to barely allow the target/target backer to slide in.
2.5 Target Clamp "Stuttering"	(1) Belt loose	(1) Loosen the turner motor bracket bolts and (2) slide the motor away from the clamp until tight. (3) Re-tighten bolts.
2.5 Recon is Stuck Downrange	(1) Obstruction on track (2) Carrier is twisted on track	(1) Check that track is clear of debris. (1) Check if Recon moves perpendicular to the track. If yes, slide Recon to left side of track and adjust the alignment wheels. If no, contact Spire.
	(3) Carrier wheel coming off axle and hitting track bolts/nuts	(1) If the older style of wheel, press the wheel back onto the axle. (2) If the wheel continues to be a problem, contact Spire for an updated wheel.
2.6 Running Into End Stops at Stall End	(1) Sensor too low (2) Sensor damaged/bad wiring	(1) Check home sensor (right side panel) on carrier to make sure the gap is minimal from homing bracket. (2) Sensor will light up when it detects metal and has power. (1) Inspect sensor for damage (generally on top). (2) Check connection on carrier circuit board for any bad connections. (3) Sensor will light up when it detects metal

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
		and has power.
2.7 Not Slowing Down When Close to Home	(1) Sensor too low (2) Sensor damaged/bad wiring	(1) Check near home sensor (left side panel) on carrier to make sure the gap is minimal from homing bracket. (2) Sensor will light up when it detects metal and has power. (1) Inspect sensor for damage (generally on top). (2) Check connection on carrier circuit board for any bad connections. (3) Sensor will light up when it detects metal and has power.
2.8 Not Responsive/Communication Error on Local Screen	(1) Dead carrier battery (2) Ethernet (RJ45) cable unplugged or damaged (3) Bullet error	(1) See problem 1.4. (1) See problem 1.4. (1) See problem 1.4.
2.9 Battery Not Holding Charge/Dying Frequently (Lasts <30min)	(1) Intermittent charging (2) Battery is old	(1) See problem 1.4. (1) Batteries are rated for 2000 charge cycles. Replace battery.

PROBLEM**POSSIBLE CAUSE****POSSIBLE SOLUTION**

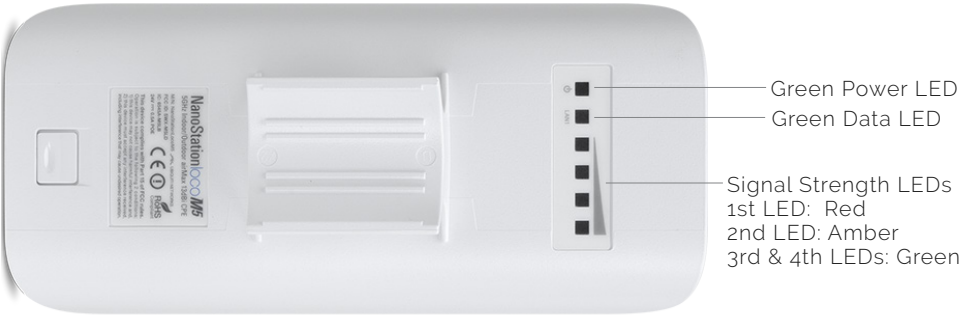
BULLET LED STATUS



LED STATUS	POSSIBLE CAUSE	POSSIBLE SOLUTION
3.0 No Lights	(1) Bad RJ45 connection	(1) Check RJ45 cable for good connection.
	(2) Bad carrier circuit board	(2) If still bad, try replacing cable.
	(3) Bad Bullet	(1) Replace carrier circuit board.
3.1 Only Green Power LED	(1) Bad RJ45 connection	(1) Contact Spire for a replacement Bullet.
	(2) PLC not powered	(1) Check RJ45 cable for good connection.
	(3) Bad carrier circuit board	(2) If still bad, try replacing cable.
	(4) Bad Bullet	(1) Check to see if PLC is powered. (2) Check if LAN SD/RD light is on/blinking. (3) If not on/blinking, contact Spire.
		(1) Replace carrier circuit board.
		(1) Contact Spire for a replacement Bullet.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
3.2 Green Power & Data LED (Steady or Flashing) But No Signal Strength LEDs	(1) Bad antenna (2) Bad Bullet	(1) Inspect antenna and antenna cable for damage. (2) Replace if needed. (2) Contact Spire for a replacement Bullet.
3.3 First & Fourth Signal Strength LEDs On	(1) Bad Bullet	(1) Contact Spire for a replacement Bullet.

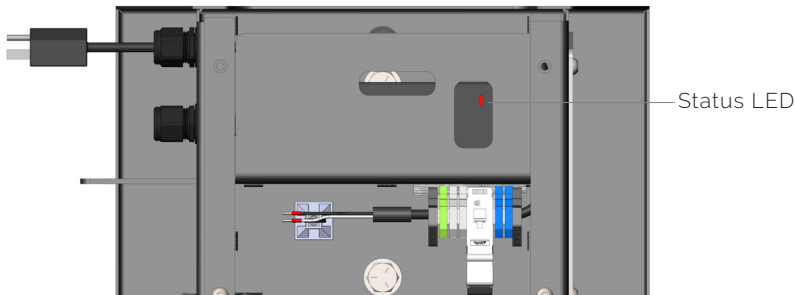
NANOSTATION LED STATUS



LED STATUS	POSSIBLE CAUSE	POSSIBLE SOLUTION
4.0 No Lights	(1) Bad RJ45 connection (2) Bad POE power supply (3) Bad Nanostation	(1) Check RJ45 cable for good connection. (2) If still bad, try replacing cable. (1) Swap RJ45 cable to another POE powered port (on ethernet switch or another 24VDC POE injector). (2) If problem persists, contact Spire for a replacement Nanostation. (1) Contact Spire for a replacement Nano-station.
4.1 Only Green Power LED	(1) Bad RJ45 connection (2) Switch not powered (3) Bad Nanostation	(1) Check RJ45 cable for good connection. (2) If still bad, try replacing cable. (1) Check to see if ethernet switch is powered on. (1) Contact Spire for a replacement Nano-station.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
4.2 Green Power & Data LED (Steady or Flashing) But No Signal Strength LEDs	(1) Bad Nanostation	(1) Contact Spire for a replacement Nanostation.
.....		
4.3 First & Fourth Signal Strength LEDs On	(1) Bad Nanostation	(1) Contact Spire for a replacement Nanostation.

CHARGE BOX LED STATUS

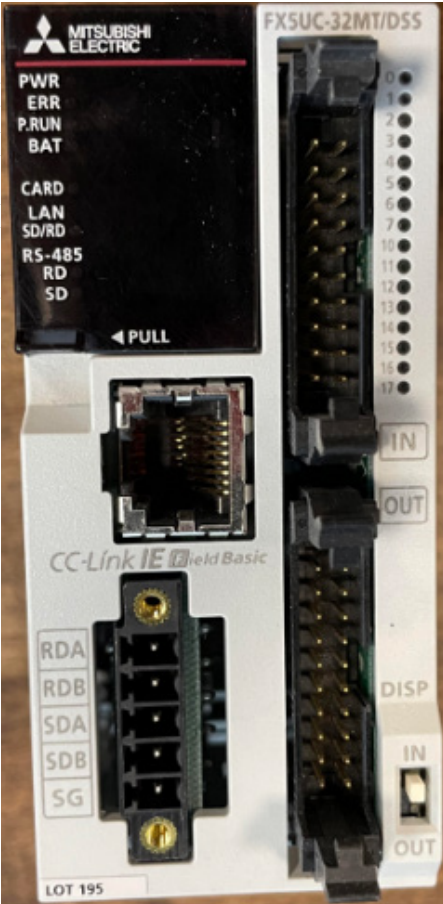


LED STATUS	POSSIBLE CAUSE	POSSIBLE SOLUTION
5.0 No Light	(1) Charge box powered off (2) Circuit breaker flipped (3) Bad charger	(1) Check power switch on the back of the charge box. (1) Check circuit breaker in charge box. (2) If problem persists, check wiring for any loose or damaged wires. (1) Replace charger.
5.1 Steady Red Light	(1) Currently charging battery	(1) No problem. Functioning as intended.
5.2 Flashing Red Light	(1) Short to ground (2) Charger fault	(1) Check inside charge box for any loose or damaged wires. (2) Check cable to rocker arms for loose or damaged wires. (3) Check carrier for loose or damaged charge lug wires. (1) Replace charger.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
5.3 Green Light (Charger not charging the carrier battery)	(1) Battery is fully charged (2) Home sensor is too low or is bad (3) Carrier charge lugs not aligned with charger rocker arm lugs (4) Rocker arms not rocking far enough for good contact (5) Bad carrier charging cable (6) Bad battery (7) Low charger voltage (<27VDC)	(1) No problem. Functioning as intended. (1) Adjust the home sensor distance from the bracket (see p. 116). (2) Power cycle carrier and allow it to return home. (3) Carrier should stop when the sensor sees the edge of the homing bracket. (4) If problem persists, replace sensor. (1) If the carrier is stopping at the correct location (in relation to the homing bracket), then adjust the rocker arm assembly location (see p. 115). (2) Tighten all 4 hex bolts to ensure bracket won't move again. (1) Adjust the "limit" bolt on the top of the rocker arm to allow better contact with the charge lug on the carrier (see p. 118). (2) Ensure that the "lock" nut on the limit bolt is tight. (1) Replace carrier charging cable. (1) Replace battery (see p. 109). (1) Check voltage on charging bracket when carrier is not home and if <27VDC then replace charger.
5.4 Alternating Red/ Green Light	(1) Intermittent connection (Rocker arms not rocking far enough for good contact)	(1) Adjust the "limit" bolt on the top of the rocker arm to allow better contact with the charge lug on the carrier (see p. 118). (2) Ensure that the "lock" nut on the limit bolt is tight.

PLC LED STATUS

- Power LED
- Error LED
- Program Run LED
- Bat LED
- Micro SD Card LED
- Ethernet Status LED
- RS-485 Read LED
- RS-485 Send LED



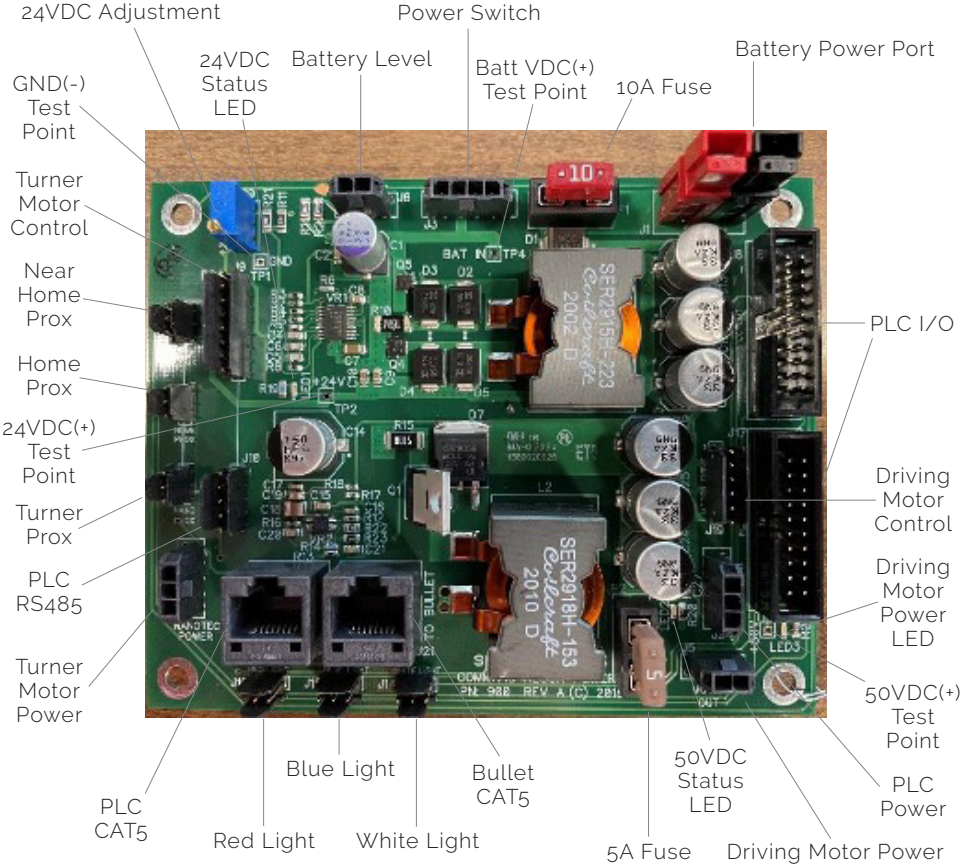
With IN/OUT switch in the IN position:

- Home
- Near Home

Input/Output LED Status Switch

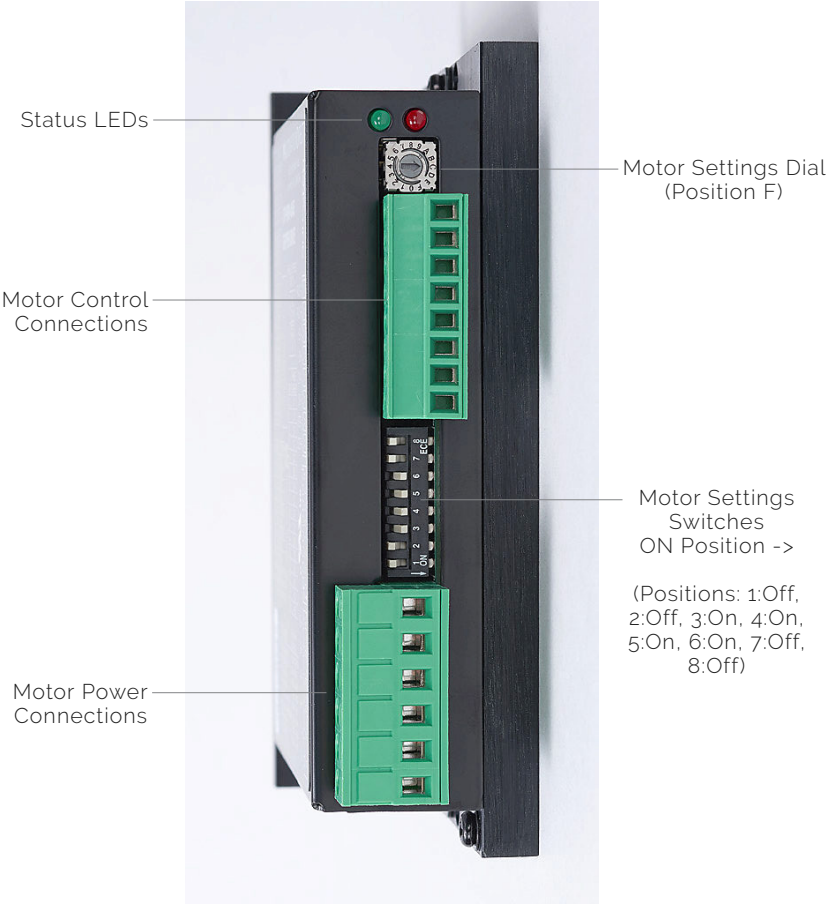
PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
6.0 No Green PWR (Power) Light	(1) Bad power cable connection/ damaged cable	(1) Inspect the PLC power cable (red/ black/green cable coming out of the bot- tom of the PLC) for damage. (2) Check the connection on the carrier circuit board. (3) Ensure that the carrier is powered on.
	 (2) Bad carrier circuit board	 (1) Verify that the carrier circuit board is functioning correctly. See p. 144.
	 (3) Bad PLC	 (1) Contact Spire for a replacement PLC.
6.1 Steady/Flashing Orange ERR (Error) Light	(1) Communications with turning motor were lost	(1) Generally is simply an alarm that there was a problem. If the carrier is function- ing correctly, then ignore the ERR light. (2) Check PLC RS485 and Turner Motor Control connections on the carrier circuit board. (3) Check the cable connections on the target turner motor.
6.2 No Green P.RUN (Program Run) Light	(1) Program not running (switch in center Stop position)	(1) Move the switch under the black cover to the Reset position and hold for 5 sec- onds. Then move it back to Run position. (2) Ensure the switch is not in the center Stop position.
6.3 Flashing Green P.RUN (Program Run)	(1) Program paused/stopped (switch in center Stop position)	(1) See 6.2.
6.4 No Green LAN SD/ RD (Ethernet Status) Light	(1) Bad/damaged ethernet cable (2) Bad wireless bullet (3) Bad carrier circuit board (4) Bad PLC	(1) Replace ethernet cable. (1) See p. 136. (1) Replace carrier circuit board. (1) Contact Spire for a replacement PLC.

CIRCUIT BOARD LED STATUS



PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
7.0 No LED1 (24VDC Status LED) Light	(1) Dead battery	(1) Check voltage between Batt VDC(+) Test Point (BAT IN TP4) and GND(-) Test Point (GND TP1). Voltage should be between 24-26VDC. (2) Replace battery if not within voltage range.
		
	(2) Blown 10A fuse (F1)	(1) Replace 10A fuse (F1).
		
	(3) Bad carrier circuit board	(1) Replace carrier circuit board.
		
7.1 No LED2 (50VDC Status LED) Light	(1) Dead battery	(1) See 7.0.
		
	(2) Blown 10A fuse (F1)	(1) See 7.0.
		
	(3) Blown 5A fuse (F2)	(1) Replace 5A fuse (F2).
		
	(4) Bad carrier circuit board	(1) See 7.0.
		
7.2 No LED3 (Driving Motor Power LED) Light	(1) Dead battery	(1) See 7.0.
		
	(2) Blown 10A fuse (F1)	(1) See 7.0.
		
	(3) Blown 5A fuse (F2)	(1) See 7.1.
		
	(4) Bad carrier circuit board	(1) See 7.0.

DRIVING MOTOR DRIVER LED STATUS



PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
8.0 No LEDs	(1) Dead battery	(1) Check voltage between Batt VDC(+) Test Point (BAT IN TP4) and GND(-) Test Point (GND TP1). Voltage should be between 24-26VDC. (2) Replace battery if not within voltage range.
	 (2) Blown 10A fuse (F1)	 (1) Replace 10A fuse (F1).
	 (3) Bad carrier circuit board	 (1) Replace carrier circuit board.
..... 7.1 Solid Green LED	 (1) Motor Disabled	 (1) Check Motor Control Connections.
..... 7.2 Blinking LED (3 Green)	 (1) Motor Enabled	 (1) Functioning normally. No problem.
..... 7.3 Blinking LEDs (1 Green + 4 Red)	 (1) Voltage High	 (1) Replace carrier circuit board.
..... 7.4 Blinking LEDs (1 Green + 5 Red)	 (1) Over Current	 (1) Check for obstructions on the track. (2) Check the carrier housing for obstructions with the wheels. (3) Ensure the carrier can move freely when off.
..... 7.5 Blinking LEDs (1 Green + 6 Red)	 (1) Open Motor Phase	 (1) Check Motor Power Connections.
..... 7.6 Blinking LEDs (2 Green + 3 Red)	 (1) Internal Voltage Bad	 (1) Replace drive.
..... 7.7 Blinking LEDs (3 Green + 3 Red)	 (1) Configuration Error	 (1) Check that the Motor Settings Dial and Switches are all in the correct positions.
..... 7.8 Blinking LEDs (2 Green + 4 Red)	 (1) Voltage Low	 (1) Replace carrier circuit board.

GLOSSARY OF TERMS:

TERM	DEFINITION
Calibration	Adjusting the various parts of the system precisely for their particular function.
Consumable Components	Products that are expected to wear out and that get used up throughout the lifetime of the product (will need to be replaced on a regular basis).
Course (of Fire)	The programmed set of actions for each shooting target.
Edge	The side of the shooting target (not face or back).
Error / Warning / Alarm	A minor problem with the system, but the system will still run.
Exposure Times	The amount of time the face (not the edge) will be positioned toward the shooter.
Fault	A major problem with the system. The system will not run.
HMI	A human-machine interface, which is a feature of any device that enables humans to engage and interact with machines. Common examples include touchscreens and keyboards.
Loctite	A brand of adhesives that is used to prevent loosening of metal fasteners caused by vibrations.
PLC	A programmable logic controller, which is a computer control system, that controls other devices based on various information available to it.

TERM

DEFINITION

Range Master

The person in charge of any given session.

Stage

A step in the Course (of Fire).

SYMBOL	DEFINITION
	Power (On/Off).
	Ethernet LED. Will light steady when an active Ethernet connection is made and flash when there is activity.
	Signal Strength.
	Caution.
	Risk of Electrical Shock.
	Risk of Hot Surface.
	Grounding Point/Terminal.

TRAIN THE BEST™