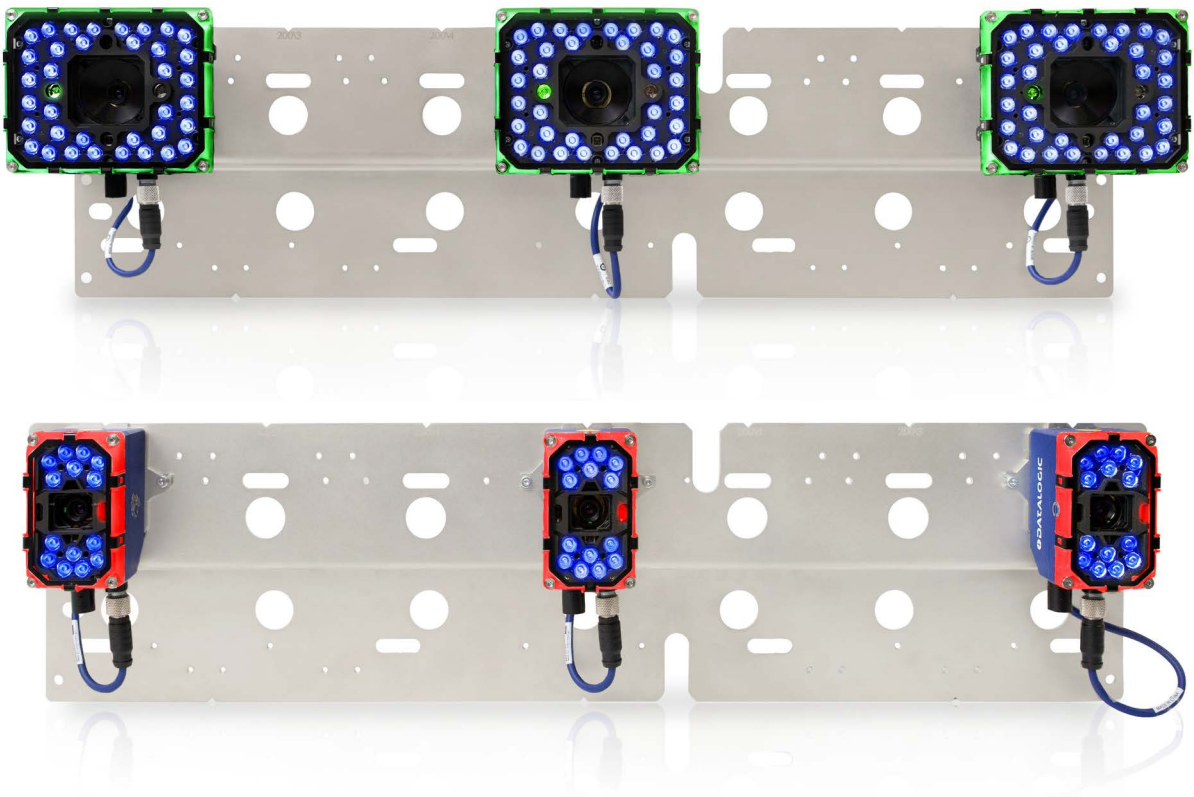


STS320™

INSTALLATION GUIDE



Solution for Tires Sorting

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Patents

See www.patents.datalogic.com for patent list.

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PREFACE

ABOUT THIS MANUAL

This Installation Guide is provided for users seeking advanced technical information, including connection, programming, maintenance and specifications. The Product Reference Guide and other publications associated with this product can be downloaded free of charge from the website listed on the back cover of this document.

Manual Conventions

The following conventions are used in this document:

The symbols listed below are used in this manual to notify the reader of key issues or procedures that must be observed when using the reader:



NOTE

Notes contain information necessary for properly diagnosing, repairing and operating the reader.



CAUTION

The CAUTION symbol advises you of actions that could damage equipment or property.




WARNING

The WARNING symbol advises you of actions that could result in harm or injury to the person performing the task.

TECHNICAL SUPPORT

Support Through the Website

Datalogic provides several services as well as technical support through its website. Log on to (www.datalogic.com).

For quick access, from the home page click on the search icon , and type in the name of the product you're looking for. This allows you access to download Data Sheets, Manuals, Software & Utilities, and Drawings.

Hover over the Support & Service menu for access to Services and Technical Support.

Reseller Technical Support

An excellent source for technical assistance and information is an authorized Datalogic reseller. A reseller is acquainted with specific types of businesses, application software, and computer systems and can provide individualized assistance.

COMPLIANCE

GENERAL

For installation, use and maintenance it is not necessary to open the reader.

Only connect Ethernet and dataport connections to a network which has routing only within the plant or building and no routing outside the plant or building.

POWER SUPPLY

ATTENTION: READ THIS INFORMATION BEFORE INSTALLING THE PRODUCT

The unit is intended to be powered by an external power supply ES1, PS3 according to IEC 62368-1:2014.

EMC COMPLIANCE

In order to meet the EMC requirements:

- connect reader chassis to the plant earth ground by means of a flat copper braid shorter than 100 mm;
- for CBX connections, connect pin “Earth” to a good Earth Ground;
- for direct connections, connect your cable shield to the locking ring nut of the connector.

CE COMPLIANCE

CE marking states the compliance of the product with essential requirements listed in the applicable European directive. Since the directives and applicable standards are subject to continuous updates, and since Datalogic promptly adopts these updates, therefore the EU declaration of conformity is a living document. The EU declaration of conformity is available for competent authorities and customers through Datalogic commercial reference contacts. Since April 20th, 2016 the main European directives applicable to Datalogic products require inclusion of an adequate analysis and assessment of the risk(s). This evaluation was carried out in relation to the applicable points of the standards listed in the Declaration of Conformity. Datalogic products are mainly designed for integration purposes into more complex systems. For this reason it is under the responsibility of the system integrator to do a new risk assessment regarding the final installation.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

LASER SAFETY

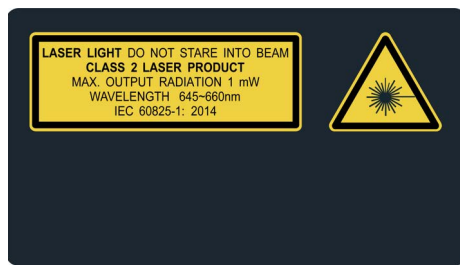
This product conforms to the applicable requirements of IEC 60825-1 and complies with 21 CFR 1040.10 except for deviations pursuant to Laser Notice N° 56, date May 8, 2019. This product is classified as a Class 2 laser product according to IEC 60825-1 regulations.



Use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to hazardous visible laser light.

Disconnect the power supply when opening the device during maintenance or installation to avoid exposure to hazardous laser light. The laser beam can be switched on or off through a software command.

The following warning label content is applied to the laser equipped products indicated in the General View illustration of this document.



Example Laser Warning Labels

The package includes labels for countries where the warning text in other languages is mandatory. Put them on the product instead of the English version.

| | | | |
|---|---|--|--|
| <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | | |
| <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | | |
| <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | | |
| <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | <p>Complies with 21 CFR 1040.10 except for conformance with IEC60825-1 Ed.3, as described in Laser Notice No. 56, dated May 8, 2019</p> | | |

To be applied on each Matrix 320 ATS-xxx

To be applied on the mounting bracket

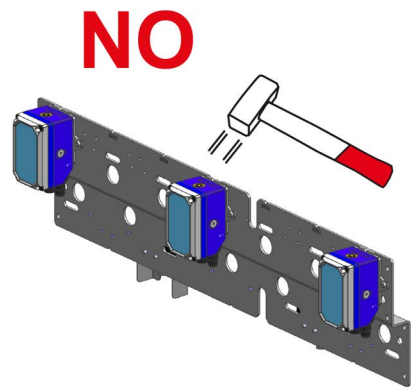
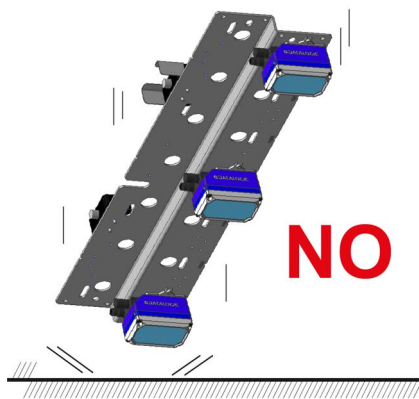
LED SAFETY

For all Datalogic STS320 compatible internal illuminators, LED emission is classified into Risk Group 1 according to EN 62471:2010.

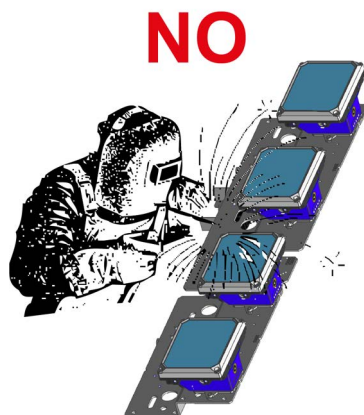
HANDLING

The STS320 is designed to be used in an industrial environment and is built to withstand vibration and shock when correctly installed, however it is also a precision product and therefore before and during installation it must be handled correctly to avoid damage.

- avoid that the array is dropped
- do not fine tune the positioning by striking the array



- do not weld the array into position, which can cause electrostatic, heat or reading window damage.
- do not spray paint near the array, which can cause reading window damage.



GENERAL VIEW

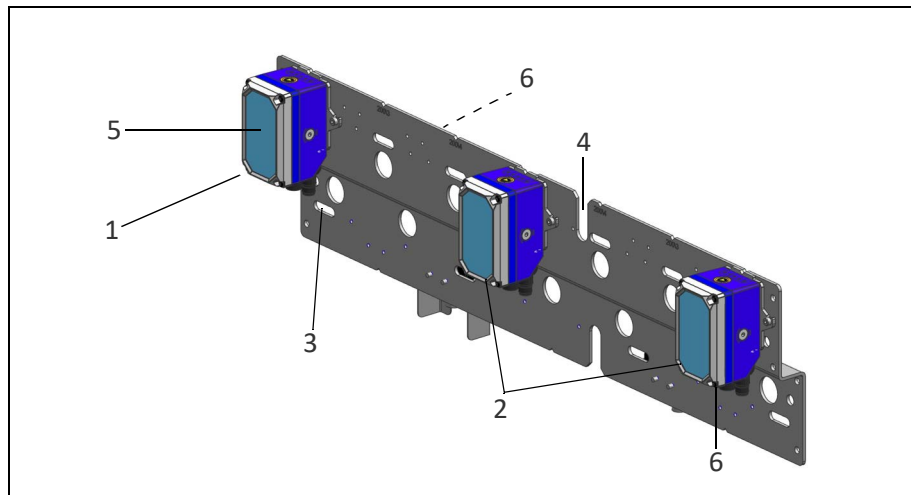


Figure 1- STS320 (14 LEDs illuminator)

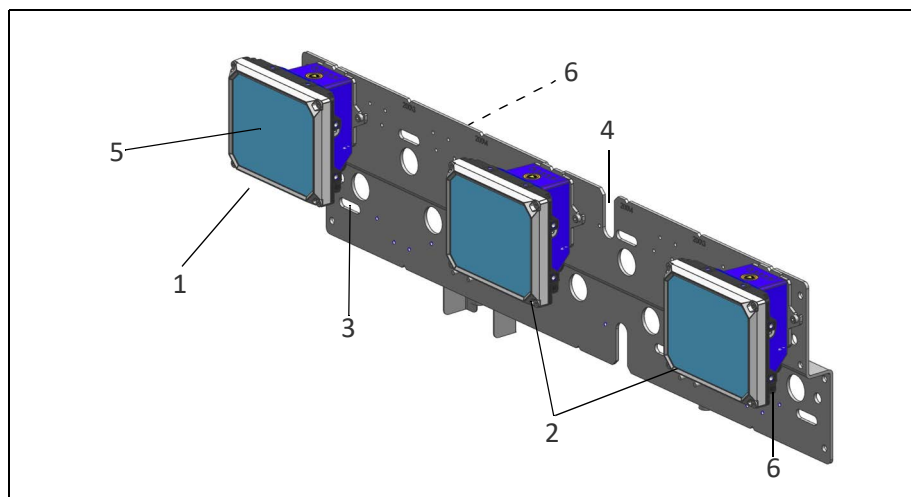


Figure 2 - STS320 (36 LEDs illuminator)

| | |
|-------------------|-----------------------------------|
| 1. ID-NET™ Master | 4. Positioning Slot |
| 2. ID-NET™ Slaves | 5. Reading Windows |
| 3. Mounting Slots | 6. Laser Class and Warning Labels |

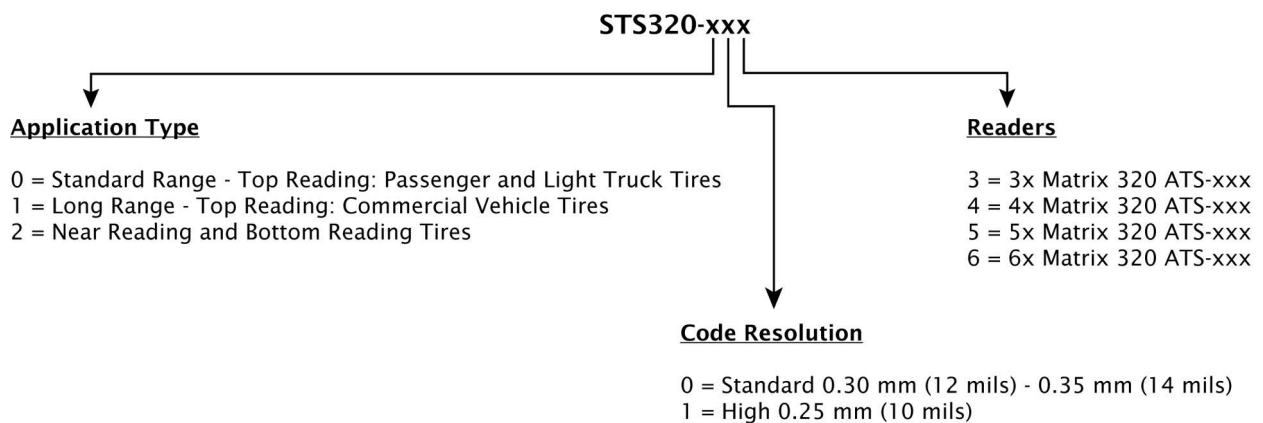
CHAPTER 1

INTRODUCTION

STS320, which means **S**olution for **T**ires **S**orting, is a solution designed to be easily integrated into a sorting system for reading barcodes on tires.

MODEL DESCRIPTION

The models differ by application type, code resolution, and number of readers.



PACKAGE CONTENTS

Verify that the STS320 and all the parts supplied with the equipment are present and intact when opening the packaging. The list of parts includes:

- STS320 array (Matrix 320 ATS-xxx readers + mounting bracket)
- 2x MEP-593 PHOTOCELL KITS (93ACC1791)
- CAB-ETH-X-M05 M12-IP67 GETH-X CAB 5M (93A050124)
- CAB-DS03-S M12-IP67 TO CBX 3M (93A050059)
- CBL-1480-03 M12/5P MALE/FEMALE 3M IDNET (93A050143)
- SCREW M 8 x 25 HAMMER HEAD+INOX NUT (Special Supporting Nut)
- CBX500 ASSY-001 FOR ATS/STS320/STS400 (93A301083)
- STS320 INSTALLATION GUIDE (821006921)
- BA200 BOSCH ADAPTERS (93ACC1822)

POWER REQUIREMENTS

The STS320 solution kit doesn't include a power supply unit, which has to be ordered separately. The maximum power required depends on the model.

Power is supplied to the system through its connection box CBX500.

The following table indicates the compatible power supply to use according to the STS320 model. The supply current consumption values are given considering the default parameter settings with the array working at maximum throughput.

| Model | Order No. | Peak Supply Current | Average Supply Current |
|---|-----------|---------------------|------------------------|
| Top Reading Passenger Car and Light Truck Solution | | | |
| STS320-003 TIRE SORT 3_HEAD ST RES | 938100001 | 3.1 A max. | 1.5 A |
| STS320-004 TIRE SORT 4_HEAD ST RES | 938100002 | 4.1 A max. | 1.9 A |
| STS320-005 TIRE SORT 5_HEAD ST RES | 938100003 | 5.1 A max. | 2.3 A |
| STS320-013 TIRE SORT 3_HEAD HI RES | 938100004 | 3.1 A max. | 1.5 A |
| STS320-014 TIRE SORT 4_HEAD HI RES | 938100005 | 4.1 A max. | 1.9 A |
| STS320-015 TIRE SORT 5_HEAD HI RES | 938100006 | 5.1 A max. | 2.3 A |
| STS320-016 TIRE SORT 6_HEAD HI RES | 938100007 | 6.0 A max. | 2.7 A |
| Top Reading Commercial Vehicle Solution | | | |
| STS320-103 TIRE SORT 3_HEAD ST RES LR | 938100008 | 3.1 A max. | 2.1 A |
| STS320-104 TIRE SORT 4_HEAD ST RES LR | 938100009 | 4.1 A max. | 2.7 A |
| STS320-113 TIRE SORT 3_HEAD HI RES LR | 938100010 | 3.1 A max. | 2.1 A |
| STS320-114 TIRE SORT 4_HEAD HI RES LR | 938100011 | 4.1 A max. | 2.7 A |
| STS320-115 TIRE SORT 5_HEAD HI RES LR | 938100012 | 5.1 A max. | 3.3 A |
| STS320-116 TIRE SORT 6_HEAD HI RES LR | 938100013 | 6.0 A max. | 3.9 A |
| Near Reading and Bottom Reading Solution | | | |
| STS320-203 TIRE SORT 3_HEAD ST RES NR | 938100014 | 3.1 A max. | 1.5 A |
| STS320-204 TIRE SORT 4_HEAD ST RES NR | 938100015 | 4.1 A max. | 1.9 A |
| STS320-205 TIRE SORT 5_HEAD ST RES NR | 938100016 | 5.1 A max. | 2.3 A |



NOTE

The suggested Power Supply for all models is PWR-240B (order no. 93ACC0264). For STS320-xx3 and STS320-xx4, we also suggest PWR-120 (order no. 93ACC0246).

CHAPTER 2

INSTALLATION

MOUNTING DISTANCE

| Model | Readers | Code Resolution | Reading Width | DOF* | Min. Reading Distance | Max. Reading Distance | Focus Distance | Vertical FOV @ min. distance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---------|-----------------|---------------|-------------|-----------------------|-----------------------|----------------|------------------------------|------------|---|-----------|-------------|-------------|-------------|-------------|------------|------------|---|-------------|------------|---|--------------|------------|---|--------------|------------|---|-----------|------------|-------------|-------------|--------------|--------------|------------|------------|---|--------------|------------|---|-----------|-------------|-------------|--------------|-------------|------------|------------|---|-------------|------------|---|--------------|------------|---|--------------|------------|---|-----------|-------------|------------|-------------|-------------|-------------|------------|------------|
| | qty | mm (mils) | mm (in) | mm (in) | mm (in) | mm (in) | mm (in) | mm (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-003 | 3 | 0.30 (12) | 950 (37.4) | 250 (9.84) | 830 (32.68) | 1080 (42.52) | 940 (37.01) | 202 (7.95) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-004 | 4 | | 1250 (49.21) | | | | | | STS320-013 | 3 | 0.25 (10) | 650 (25.59) | 620 (24.41) | 870 (34.25) | 730 (28.74) | 152 (5.98) | STS320-014 | 4 | 850 (33.46) | STS320-015 | 5 | 1050 (41.34) | STS320-016 | 6 | 1250 (49.21) | STS320-103 | 3 | 0.35 (14) | 950 (37.4) | 400 (15.75) | 850 (33.46) | 1250 (49.21) | 1000 (39.37) | 211 (8.31) | STS320-104 | 4 | 1250 (49.21) | STS320-113 | 3 | 0.25 (10) | 650 (25.59) | 830 (32.68) | 1230 (48.43) | 970 (38.19) | 145 (5.71) | STS320-114 | 4 | 850 (33.46) | STS320-115 | 5 | 1050 (41.34) | STS320-116 | 6 | 1250 (49.21) | STS320-203 | 3 | 0.30 (12) | 770 (30.31) | 170 (6.69) | 280 (11.02) | 450 (17.72) | 330 (12.99) | 157 (6.18) | STS320-204 |
| STS320-013 | 3 | 0.25 (10) | 650 (25.59) | | 620 (24.41) | 870 (34.25) | 730 (28.74) | 152 (5.98) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-014 | 4 | | 850 (33.46) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-015 | 5 | | 1050 (41.34) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-016 | 6 | | 1250 (49.21) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-103 | 3 | 0.35 (14) | 950 (37.4) | 400 (15.75) | 850 (33.46) | 1250 (49.21) | 1000 (39.37) | 211 (8.31) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-104 | 4 | | 1250 (49.21) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-113 | 3 | 0.25 (10) | 650 (25.59) | | 830 (32.68) | 1230 (48.43) | 970 (38.19) | 145 (5.71) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-114 | 4 | | 850 (33.46) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-115 | 5 | | 1050 (41.34) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-116 | 6 | | 1250 (49.21) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-203 | 3 | 0.30 (12) | 770 (30.31) | 170 (6.69) | 280 (11.02) | 450 (17.72) | 330 (12.99) | 157 (6.18) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-204 | 4 | | 1010 (39.76) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STS320-205 | 5 | | 1250 (49.21) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* DOF = Max. Reading Distance - Min. Reading Distance

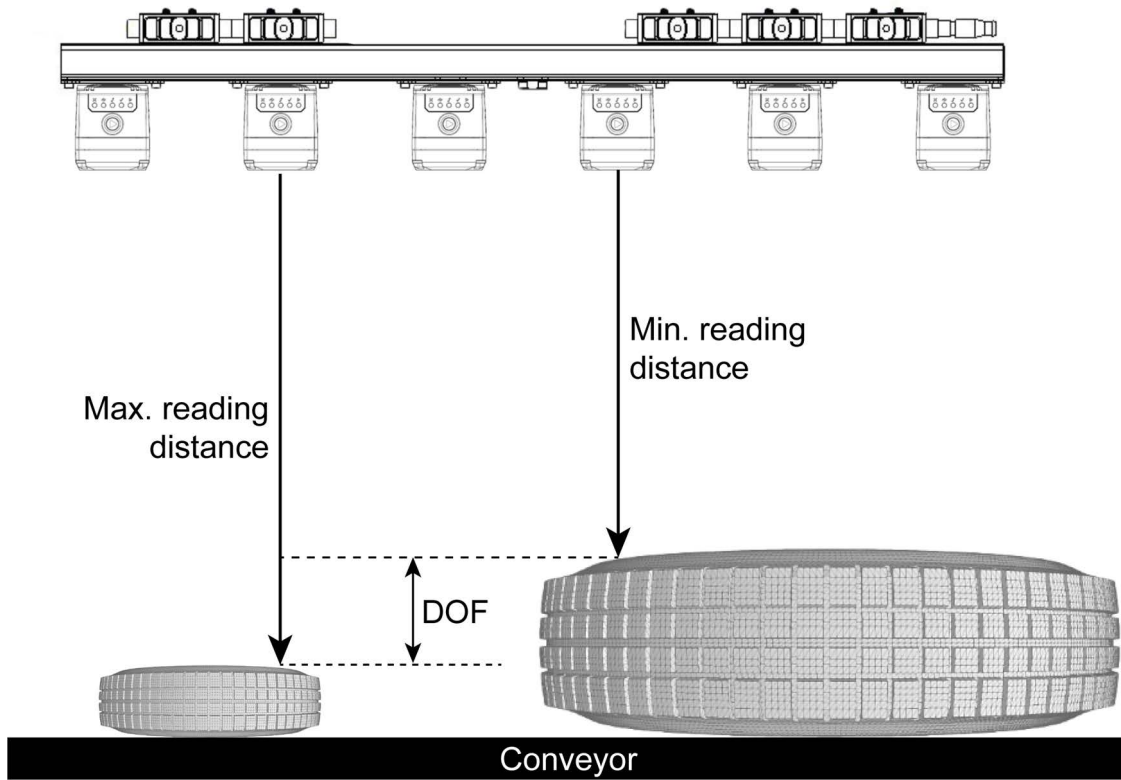


Figure 3 - STS320 (14 LEDs illuminators) mounting distance

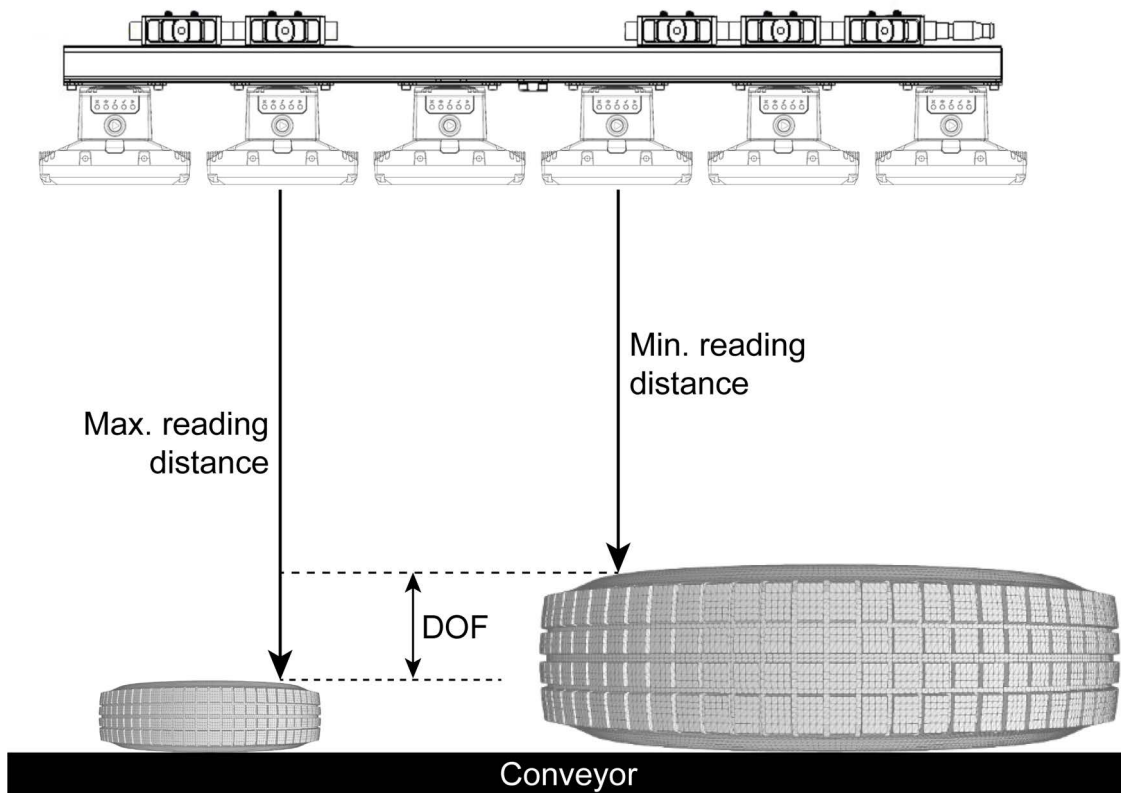


Figure 4 - STS320 (36 LEDs illuminators) mounting distance

STS320 MAIN PLATE MOUNTING

Once the supporting profile has been positioned at the correct height we can proceed with the STS320 mechanical mounting.

STS320 has been designed to be easily installed by one person using the T-bolt, special plate supporting nut and locknut supplied in the kit:

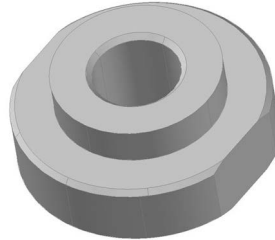


Figure 5 - STS320 Plate Supporting Nut

The plate supporting nut has to be coupled to the frame with the M8 x 25 mm T-bolt:

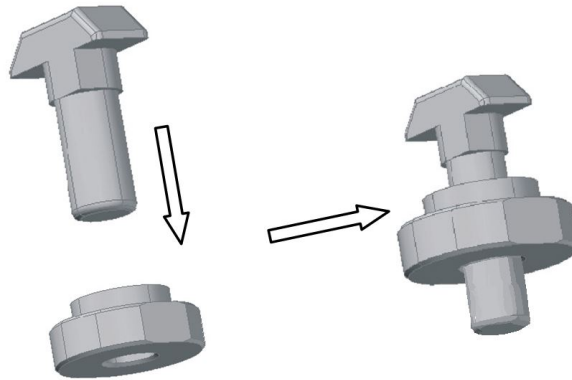
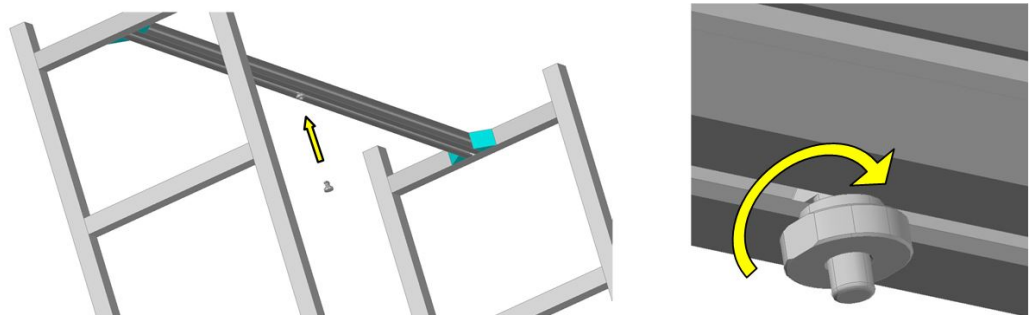


Figure 6 - STS320 Plate Support Assembly

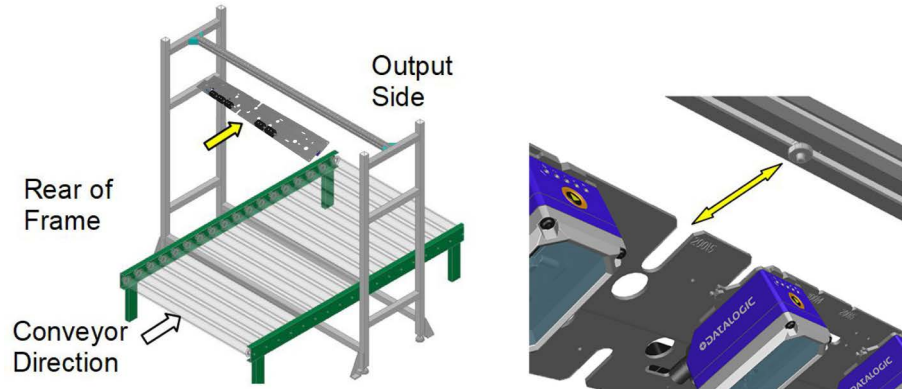
Mount the plate support assembly onto the bottom side of the STS320 supporting frame. When the T-bolt is inserted into the profile slot, position it directly over the center¹ of the conveyor and completely tighten the nut:



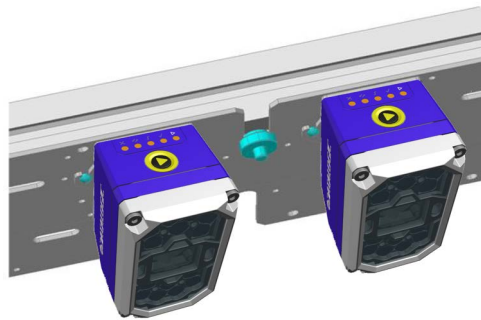
Finally, the STS320 can be mounted onto the station frame.

1. For STS320 models with an even number of readers the main plate slot, FOV, and operating width are congruent. If the STS320 model has an odd number of readers, the central reader must be aligned with the center of the conveyor.

The STS320 has to be installed onto the station frame in the conveyor direction so that the main plate slot (reader side) is aligned with the plate support assembly.



Slide the main plate slot between the plate support assembly and the supporting profile until it reaches the end.



The plate support assembly can fully support the STS320 weight without human help.

Fix the STS320 using 4 T-bolts and nuts (not supplied) to the supporting profile. When the main plate slot is fully inserted onto the plate support assembly, the 4 mounting slots are aligned with the supporting profile groove:

Also screw the locknut onto the plate support assembly and tighten it.

PRESENCE SENSOR POSITIONING

The STS320 system comes with a pair of photocells that can be used to detect the presence of the tire on the conveyor and trigger the beginning and the end of the reading phase. When used, they must be positioned and mounted at the conveyor belt level depending on the size of the tires that must be handled.

Position the presence sensors according to the following procedure:

1. Retrieve the size of the minimum tire height (H_{min}) at the minimum tire width (W_{min}).
2. Determine the field of view along the conveyor direction (FOV_v) at the maximum distance. See the table below.

| Model | Typical FOV @ Max. Distance |
|------------|-----------------------------|
| STS320-00x | 260 mm |
| STS320-01x | 211 mm |
| STS320-10x | 305 mm |
| STS320-11x | 214 mm |
| STS320-20x | 247 mm |

3. If the minimum tire height (H_{min}) is less than the $FOV_v/2$ at the maximum distance, then both Reading Phase ON and Reading Phase OFF presence sensors are required and they must be mounted at the H_{min} distance from the edges of the vertical FOV as shown in the figure below:

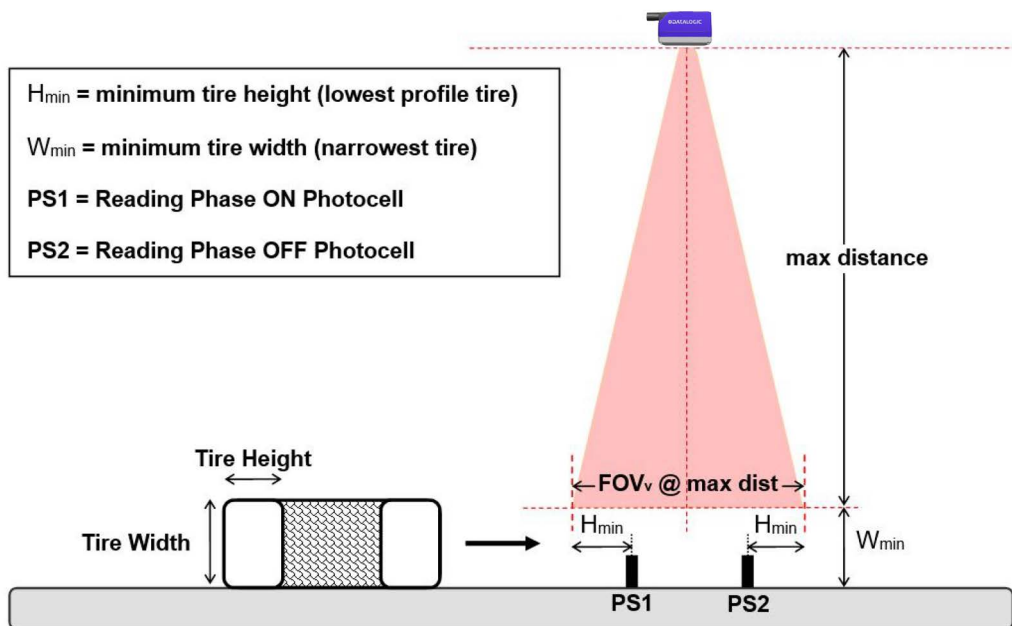


Figure 7 - Top reading station with two presence sensors

In some cases the system can work with only one photocell.

If the minimum tire height (H_{min}) is greater than the $FOV_v/2$ at the maximum distance, then only a single presence sensor is required and it must be mounted at the mid point of the field of view as shown in Figure 8:

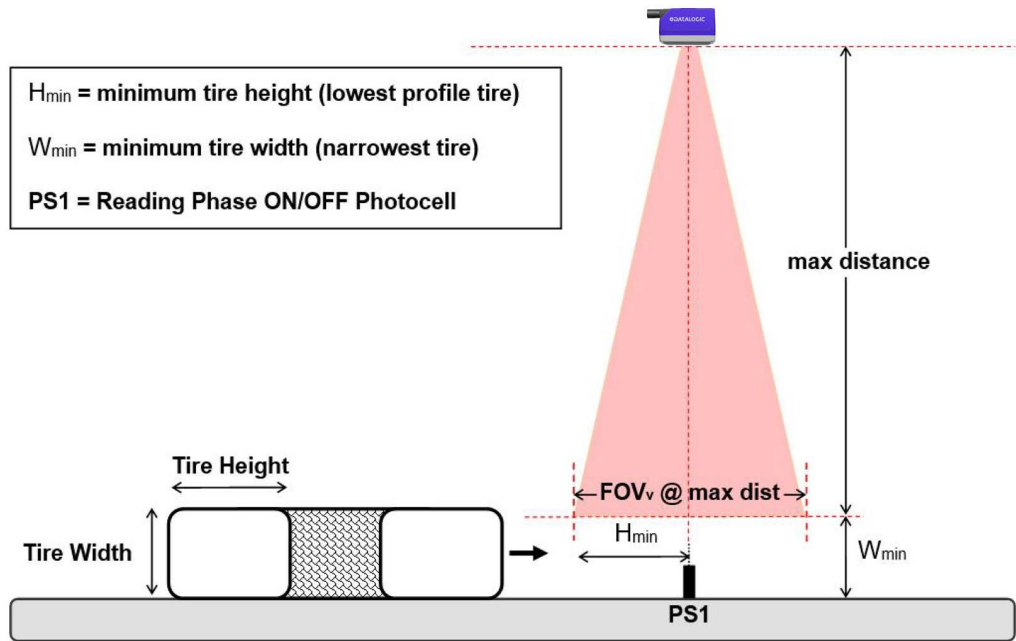
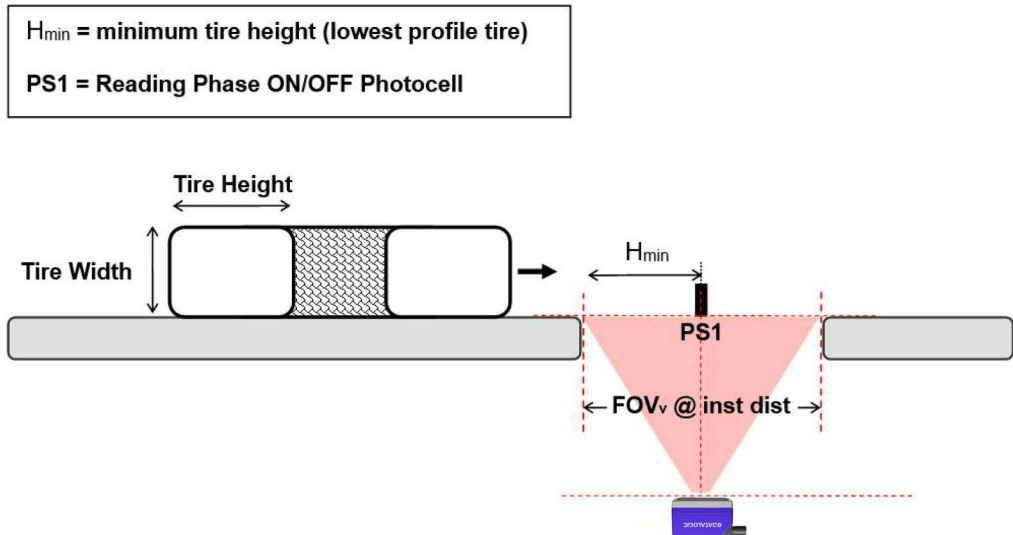


Figure 8 - Top reading station with single presence sensor



NOTE

This configuration requires modifying the Master default Reading Phase OFF parameter to External Trigger Trailing Edge, Complete Read.



NOTE

For Bottom Reading Stations installed at the minimum nominal reading distance of 280 mm (11.02 in), the Vertical FOV is 157 mm (6.18 in). If allowed by the application, it is suggested to use this value for the conveyor gap to maximize the reading area.

Smaller gaps can be used and maximized by modifying the configuration. Please contact your local Datalogic representative for feasibility.

CHAPTER 3

ELECTRICAL CONNECTIONS

STS320 WIRING DIAGRAM

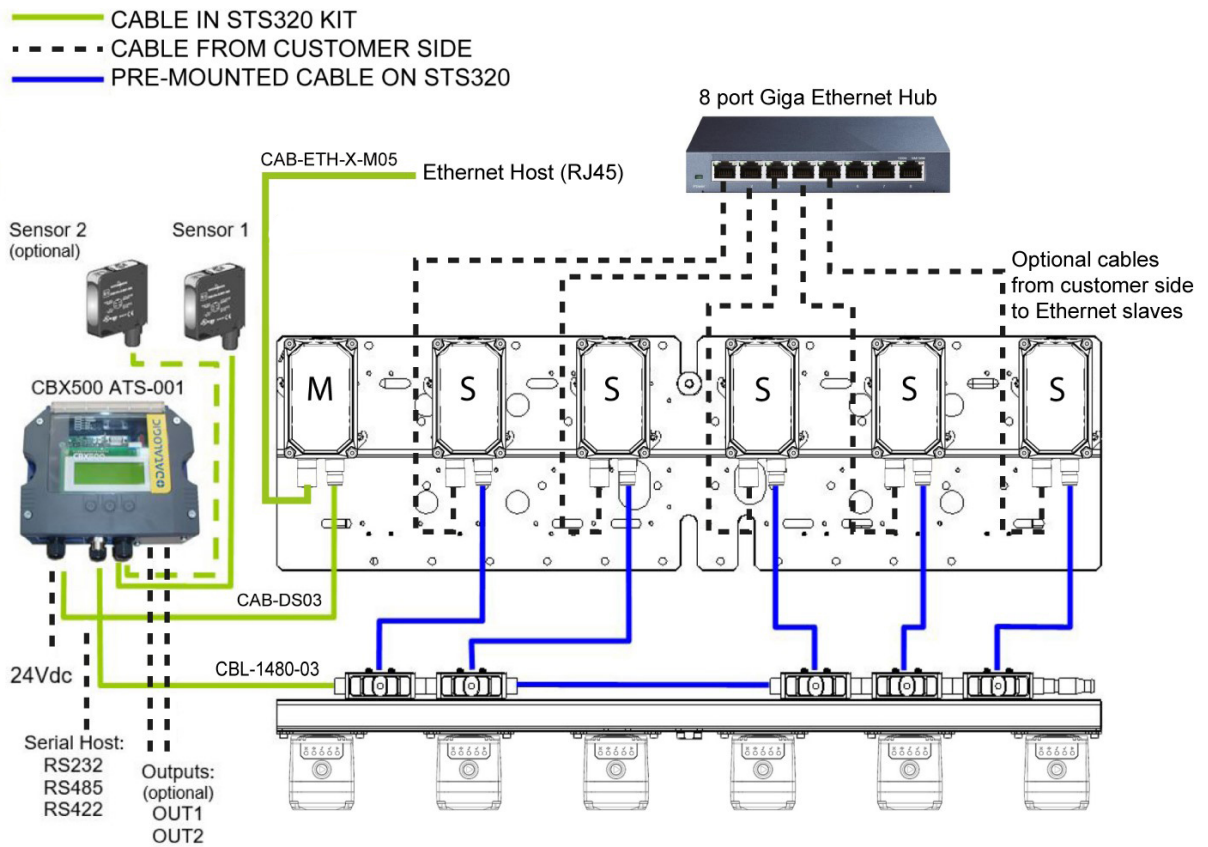


Figure 9 - STS320 Array Wiring

POWER SUPPLY

Power is supplied through the CBX500 spring clamp terminal pins as shown in the figure below.

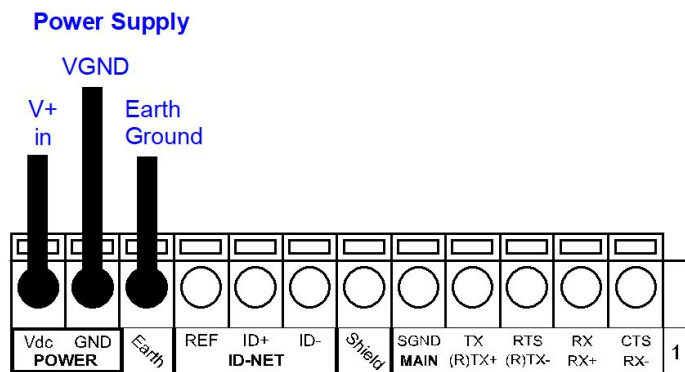


Figure 10 - Power Supply Connections

For all STS320 models the power must be 24 Vdc only.

It is recommended to connect the array CHASSIS to earth ground (Earth) by setting the appropriate jumper in the CBX connection box. See the CBX Installation Manual for details.

M12 X-CODED 8-PIN CONNECTOR (ETHERNET)

The Host can connect to the STS320 Master reader's on-board Ethernet (M12 X-Coded) connector. This interface is IEEE 802.3 10 BaseT and IEEE 802.3u 100 BaseTx compliant.

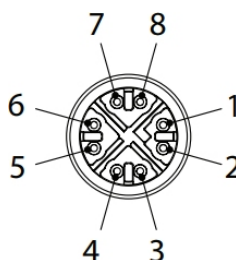


Figure 11 - M12 X-Coded Female Ethernet Network Connector

| M12 X-Coded Ethernet Network Connector pinout | | |
|---|------|------------------------|
| Pin | Name | Function |
| 1 | DA+ | Bidirectional data DA+ |
| 2 | DA- | Bidirectional data DA- |
| 3 | DB+ | Bidirectional data DB+ |
| 4 | DB- | Bidirectional data DB- |
| 5 | DD+ | Bidirectional data DD+ |
| 6 | DD- | Bidirectional data DD- |
| 7 | DC- | Bidirectional data DC- |
| 8 | DC+ | Bidirectional data DC+ |

DIGITAL INPUTS

There are two optocoupled polarity insensitive inputs available on the reader: Input 1 (External Trigger) and Input 2, a generic input:

These inputs can be used to control (start/stop) the reading phase:

| Parameter Source | Reading Phase ON Input | Reading Phase OFF Input |
|------------------------|---|---|
| Single Presence Sensor | External Trigger Leading Edge | External Trigger Trailing Edge |
| Two Presence Sensors | External Trigger Leading Edge | Input 2 Trailing Edge |
| PLC Digital Output | External Trigger Leading Edge or Input 2 Leading Edge | External Trigger Trailing Edge or Input 2 Trailing Edge |



NOTE

Alternatively, host communication output commands (Serial or Fieldbus) can be used to control the reading phase. See the DL.CODE Configuration Parameters Help On Line for details.

The electrical features of both inputs are:

$$V_{AB} = 30 \text{ Vdc max.}$$

$$I_{IN} = 10 \text{ mA (reader) + 12 mA (CBX) max.}$$

The active state of these inputs is selected in software.

An anti-disturbance filter is implemented in software on both inputs so that the minimum pulse duration is $\cong 0.5$ milliseconds. This value can be increased through software.

These inputs are optocoupled and can be driven by PNP type commands.



NOTE

Polarity insensitive inputs assure full functionality even if pins A and B are exchanged.

Input Connections for Presence Sensors (provided in the package)



NOTE

Power is available directly to the Input Device, independently of the Power Supply Switch inside the CBX.

The sensors included in the STS320™ have a standard pinout (brown = +Vdc; blue = GND; black = switched) and can be connected to the Trigger and Input 2 as shown in the figures below.

| Sensor 1 | CBX500 Row 2 | Function |
|----------|--------------------|---|
| brown | +V | Power Source - External Trigger |
| black | I1A | External Trigger A (polarity insensitive) |
| blue | I1B | External Trigger B (polarity insensitive) |
| | -V (bridge to I1B) | Power Reference - External Trigger |

Presence Sensor Photocell (PNP)

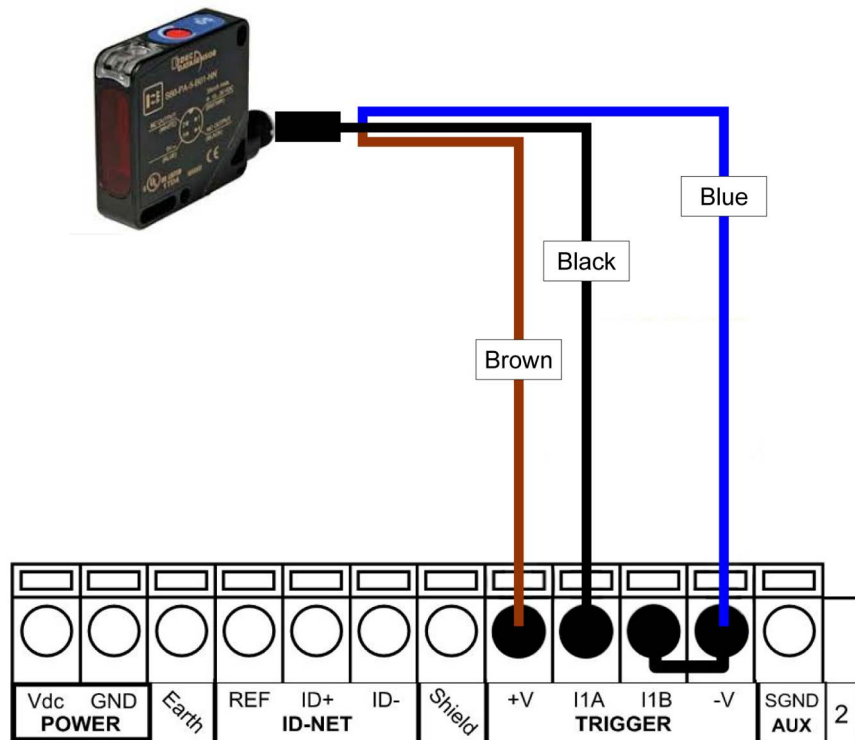


Figure 12 - Presence Sensor connected to External Trigger

The yellow Trigger LED on the reader is on when the active state of the External Trigger corresponds to ON.

| Sensor 2 | CBX500 Row 2 | Function |
|----------|--------------------|----------------------------------|
| brown | +V | Power Source - External Trigger |
| black | I2A | Input 2 A (polarity insensitive) |
| blue | I2B | Input 2 B (polarity insensitive) |
| | -V (bridge to I2B) | Power Reference - Inputs |

Presence Sensor Photocell (PNP)

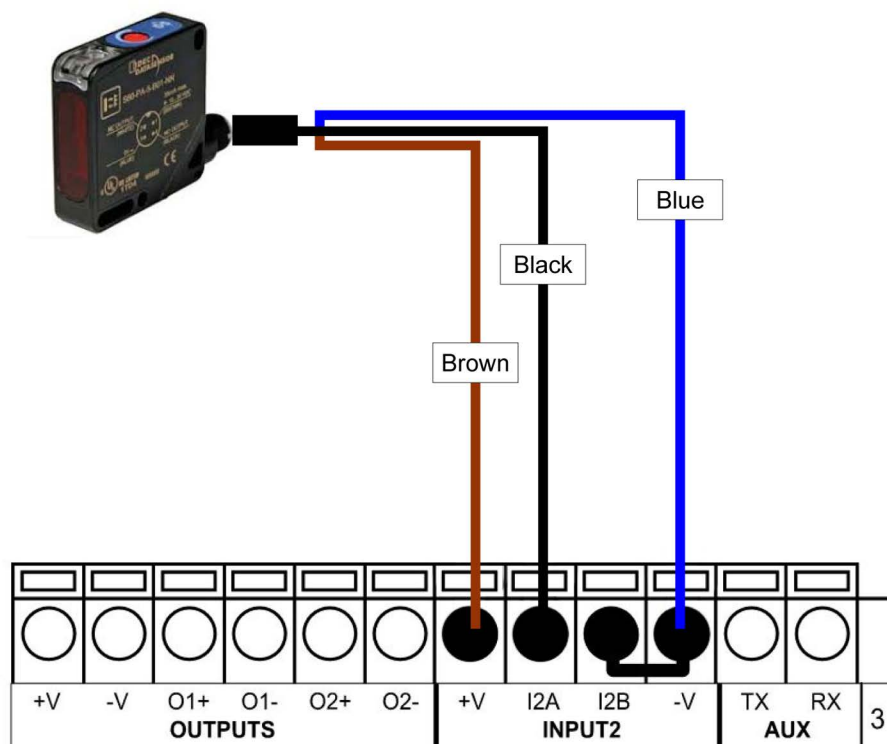


Figure 13 - Presence Sensor Connected to Input 2

Input Connections from PLC

Alternatively, the reading system can be controlled by a digital output of a PLC. For this purpose, connect the switched signal and the appropriate reference level as shown in the figures below.

| PLC Signal | CBX500 Row 2 | Function |
|------------|--------------|---|
| Input | I1A | External Trigger A (polarity insensitive) |
| Reference | I1B | External Trigger B (polarity insensitive) |

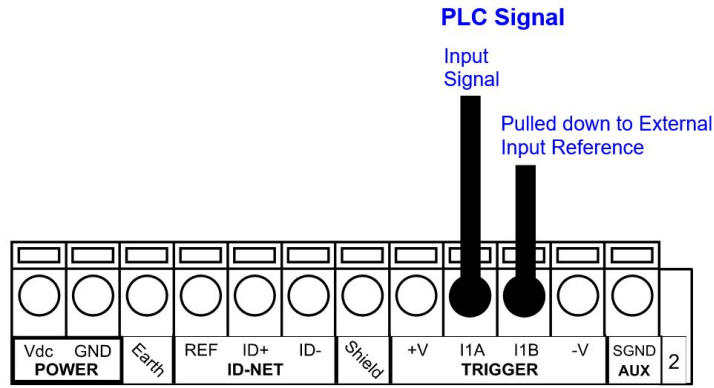


Figure 14 - External Trigger Connected to PLC

The yellow Trigger LED on the reader is on when the active state of the External Trigger corresponds to ON.

| PLC Signal | CBX500 Row 3 | Function |
|------------|--------------|----------------------------------|
| Input | I2A | Input 2 A (polarity insensitive) |
| Reference | I2B | Input 2 B (polarity insensitive) |

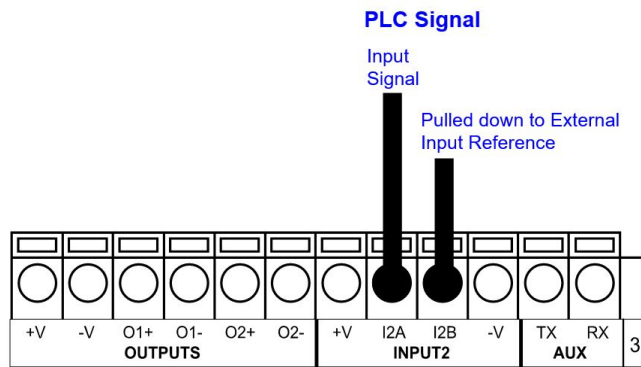


Figure 15 - Input 2 Connected to PLC

DIGITAL OUTPUTS

Three short-circuit protected outputs are available that can be configured as NPN, PNP and PP. Using a CBX connection box, the first two outputs are opto-coupled. The meaning of the three outputs can be defined by the user. They are typically used to signal the data collection result. They are also available to the Host (either serial or Fieldbus) to be driven independently.

The electrical features of the two outputs are the following:

$$V_{OUT} (I_{LOAD} = 0 \text{ mA}) \text{ max. } 24 \text{ Vdc}$$

$$V_{OUT} (I_{LOAD} = 100 \text{ mA}) \text{ max. } 3 \text{ Vdc}$$

$$I_{LOAD} \text{ max. } 100 \text{ mA}$$

By default, Output 1 is associated with the Partial Read and No Read events, which activates when the code(s) signaled by the external trigger are not decoded, and Output 2 is associated with the Complete Read event, which activates when all the selected codes are correctly decoded. The output signals are fully programmable through DL.CODE.

Output Connections Using STS320 Power



Power is available directly to the Output Device, independently of the Power Supply Switch inside the CBX.

The digital outputs can power and drive small devices meeting the electrical characteristics above such as electronic switches which can then manage larger power consuming devices such as signaling lights or other machinery.

| CBX500 | Function |
|--------|-------------------------|
| +V | Power Source - Outputs |
| O1+ | Output 1 + |
| O1- | Output 1 - |
| O2+ | Output 2 + |
| O2- | Output 2 - |
| -V | Power Reference Outputs |

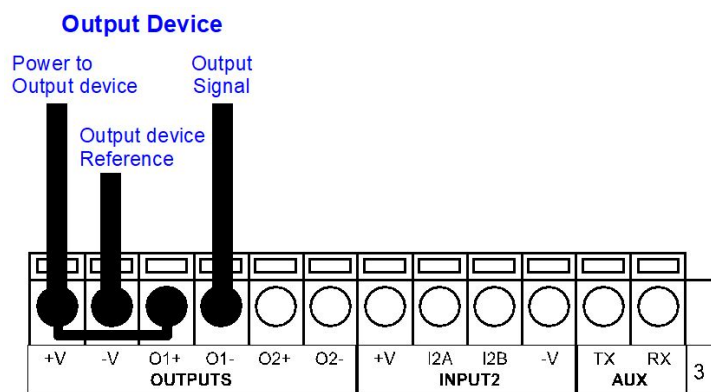


Figure 16 - Open Emitter Output using STS320 Power

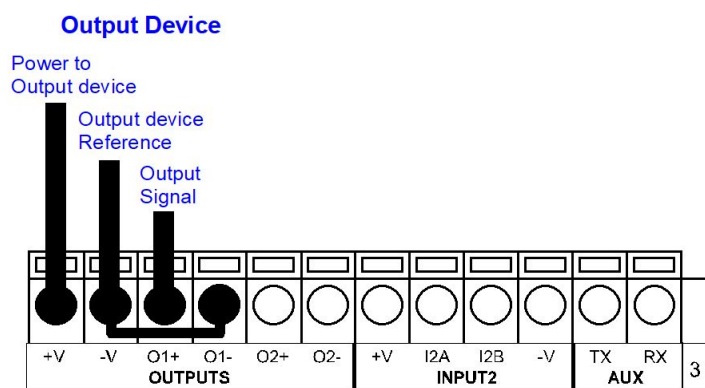


Figure 17 - Open Collector Output using STS320 Power

CHAPTER 4

SOFTWARE CONFIGURATION

There are two main methods that can be used to complete the STS320 installation.

The first regards stations that do not need any application specific parameter configuration. The factory default configuration is sufficient and the only necessary steps are to align the Master IP Address to the Host LAN through a web browser using the Web Discovery feature, then backup the configuration through the CBX500 menu.

The second method requires installation of the DL.CODE configuration program. Through DL.CODE, IP Addresses are aligned, application specific parameters are configured, and backup procedures are performed both to the external storage device (BM100), as well as to a file.

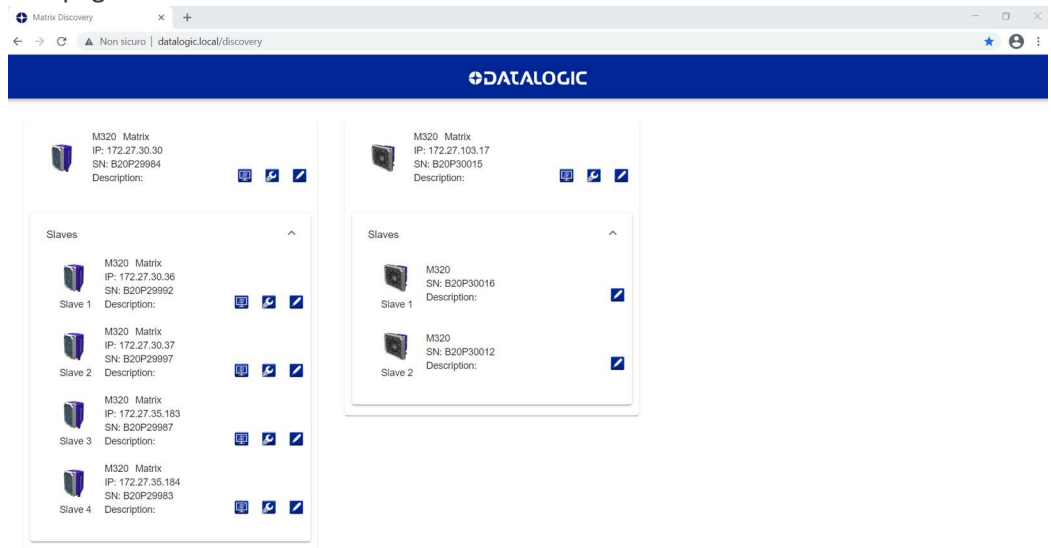
STS320 DEFAULT CONFIGURATION

| | |
|-----------------------------|--|
| Default IP Address | 192.168.3.100 |
| Code symbologies | CODE128, CODE39, INT20F5 (min. 8 digits) |
| Layout type | Synchronized |
| Operating mode | Phase mode Phase ON: Input 1 - Leading Edge Phase OFF: Input 2 - Trailing Edge |
| Acquisition trigger | Periodic (25 ms) |
| Data collection type | Code combination (1 expected code) |
| Output | <ul style="list-style-type: none">• Good Read: Output 2, Green Spot, 360° Green Feedback• No Read: Output 1, Red Spot, 360° Red Feedback• Configuration Mode: 360° Blue Feedback |
| Output Message 1 | Event Type: Good Read, Output Channel: TCP Server (port 51236), Message content: <STX><CodeContent><CR><LF> |
| Output Message 2 | Event Type: No Read, Output Channel, TCP Server (port 51236), Message content: <STX><CAN><CR><LF> |

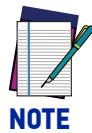
CONFIGURATION USING WEB DISCOVERY

Devices can be discovered via web interface. To do this, from either the Host PC or configuration PC connected to the network, open your browser and go to <http://data-logic.local/>.

This page shows all devices available in the network:






Click on the wrench icon and input the correct IP Address settings (from network administrator) and optional Device Description for each reader.



At least one device must be reachable from the user PC. For example, if there are several subnetworks, at least one device must be in the same subnetwork of the PC.

The following functions are available for each discovered device:

| | |
|---|--|
|  | <p>Open the Web Monitor page of the selected device.</p> |
|  | <p>Display and configure the Ethernet settings, as shown in the figures below (left: device in DHCP mode^a; right: device in Static mode):</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="699 1485 986 1709"> <p>Ethernet Settings</p> <p>MAC Address: <input type="text" value="00:07:BE:09:07:CF"/></p> <p>Use DHCP: <input checked="" type="checkbox"/></p> <p><input type="button" value="OK"/></p> <p><input type="button" value="Cancel"/></p> </div> <div data-bbox="1038 1357 1321 1709"> <p>Ethernet Settings</p> <p>MAC Address: <input type="text" value="00:07:BE:07:AB:AB"/></p> <p>Use DHCP: <input type="checkbox"/></p> <p>IP Address: <input type="text" value="192.168.3.100"/></p> <p>Subnet Mask: <input type="text" value="255.255.255.0"/></p> <p>Gateway Address: <input type="text" value="0.0.0.0"/></p> <p>DNS1 Address: <input type="text" value="0.0.0.0"/></p> <p><input type="button" value="OK"/></p> <p><input type="button" value="Cancel"/></p> </div> </div> |
|  | <p>Set the device description. In case of Slave devices, this button is only available if the corresponding Master device is reachable.</p> <div data-bbox="868 1809 1155 1989"> <p>Device Description</p> <p>Device Description: <input type="text"/></p> <p><input type="button" value="OK"/></p> <p><input type="button" value="Cancel"/></p> </div> |

a. Use DHCP addressing only if the network is connected to a DHCP Server.

BACKUP PROCEDURE USING CBX500 HMI INTERFACE

Keypad and Display

The CBX500 display can be used with the three buttons below it. The up arrow button allows you to scroll up through the menu. The down arrow button allows you to scroll down through the menu. With the middle button, you can confirm your selection:



To access the menu, press the two outermost buttons simultaneously for several seconds. The menu structure is shown below.

Menu: [Exit] (exits HMI Interface menu)

- Test Mode
- Focus/Locate
- Calibration
- Code Setting
- View

Extended (enters Extended menu)

Extended: [Exit] (returns to Main menu)

- Backup
 - Yes** (performs Backup - uninterruptible)
 - No** (returns to Extended menu)
- Restore
 - Yes** (performs Restore - uninterruptible)
 - No** (returns to Extended menu)



NOTE

NEVER select the “Focus/Locate” or “Calibration” items.

Backup procedure

1. Make sure the Write Protection switch (inside the CBX500) on the BM100 is unlocked.
2. Select the Backup item from the Extended menu and press the Enter key on the **Yes** item.
3. When the procedure is complete a message appears on the display showing the results (**Done** or **Error**).
4. Set the Write Protection switch to locked.

After performing the Backup installation is completed. You can check the station performance using the Web Monitor.

WEB MONITOR

Web Monitor is a remote monitoring tool provided to visualize STS320 in its run-time environment. You can access it from the DL.CODE Task area, from the Discovery page, or from your browser by inputting the IP address of the reader. STS320 must be available on the LAN.

This works on major browsers (also on smartphones and tablets), which support HTML5.

| Chrome | Firefox | Edge | IE | Safari | iOS | Android | IE Mobile |
|--------|---------|------|----|--------|-----|-----------------------------------|-----------|
| latest | latest | 14 | 11 | 10 | 10 | Nougat (7.0) Marshmallow (6.0) | 11 |
| | | 13 | 10 | 9 | 9 | Lollipop (5.0, 5.1) | |
| | | | 9 | 8 | 8 | KitKat (4.4.) | |
| | | | | 7 | 7 | Jelly Bean (4.1, 4.2, 4.3) | |




The Web Monitor tool provides the following features:

Info page

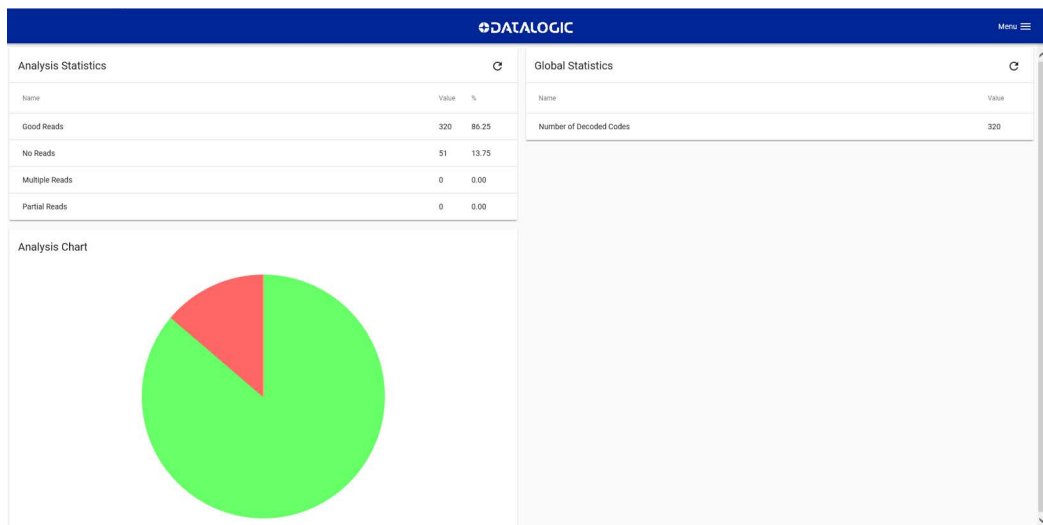
The screenshot shows the 'Info page' of the Web Monitor tool. It features a dark blue header with the 'DATALOGIC' logo. The page is divided into two main sections: 'Device Info' and 'Network Info'. The 'Device Info' section includes fields for Device Name (M300Nsempini2), Model (M300N 482-010), Serial number (C16E06670), and Software Version (1.6.2.21-BETA02). The 'Network Info' section includes fields for DHCP (Disabled), IP Address (10.239.37.191), Subnet Mask (255.255.248.0), Gateway (0.0.0.0), and MAC Address (00:07:BE:02:57:0A). Below these sections is a 'Current Device Configuration' section with 'Running' and 'Startup' both set to 'Trending'.

Monitoring Page

The screenshot shows the 'Monitoring Page' of the Web Monitor tool. It features a dark blue header with the 'DATALOGIC' logo and a 'Menu' icon. The main content area displays a grid of QR codes on a light-colored background. A green box highlights one of the QR codes in the center. To the left of the grid, there are vertical labels '1041' and '1020'. In the bottom left corner, there is a red-bordered box containing three circular icons: a square, a circle, and an exclamation mark. In the bottom right corner, there is a small box labeled 'Scanned Second: 6'.

| | |
|---|---|
|  | <p>The Stop/Play button allows you to stop image monitoring to save a particular image. The reader continues to run, only the monitored image is stopped.</p> |
|  | <p>The Save image button automatically downloads the current image as a jpg file to the browser's default Download folder. The default naming syntax is <code>image_weekday month day year.jpg</code> (i.e. <code>image_Wed Jan 23 2019.jpg</code>)</p> |
|  | <p>The options button opens an options panel on the Monitoring window which allows:</p> <ul style="list-style-type: none"> - setting the quality of the image to monitor (higher quality images reduce framerate) - showing only positive results (good read), only negative results, or all results - showing Code List - showing Web Monitor images per second - showing x,y Coordinates to the Monitoring window. The coordinates report the mouse position over the monitored image (in pixels). <p>To close the options panel, click on the image area.</p> |

Statistics Page

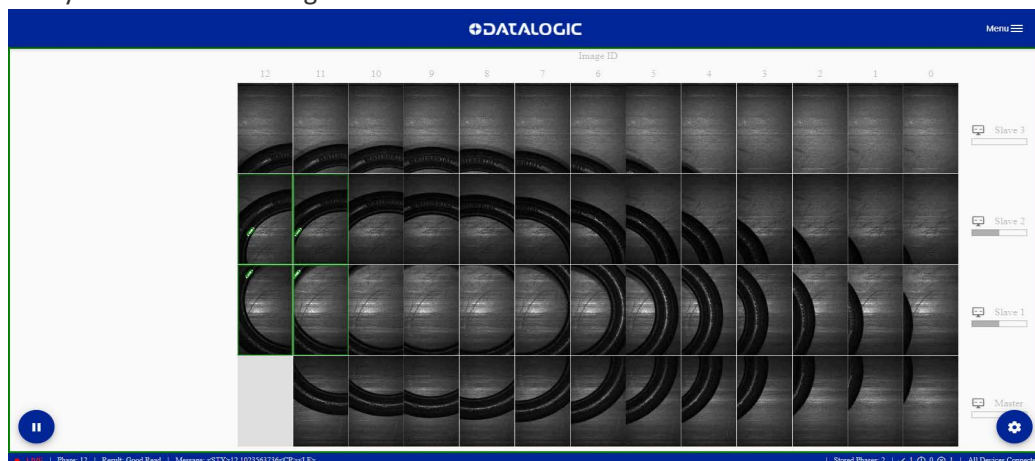


Diagnostics Page

| Diagnostics | | |
|-------------|-------------------------------------|--------|
| Alarm Code | Description | Status |
| 1 | Slave No Reply | ● |
| 64 | Slave Address Duplication | ● |
| 171 | Protocol Index Failure | ● |
| 185 | Backup Memory Communication Failure | ● |
| 187 | Wrong Rotary Switch Selection | ● |
| 189 | Fieldbus Communication Failure | ● |
| 191 | Fieldbus Type Mismatch | ● |
| 193 | Fieldbus Configuration Error | ● |
| 195 | Fieldbus DHCP Problem | ● |
| 301 | SC5000 Communication Failure | ● |
| 302 | SC5000 Response Failure | ● |
| 99998 | Camera Head Failure | ● |

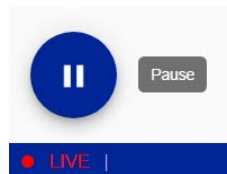
Web Mosaic

The Web pages of the Master reader include the Mosaic view, which is helpful to check the system behavior at a glance.



As shown in the figure above, a scaled version of the images acquired in each reading phase is retrieved from all readers and arranged side by side in a single frame.

The Mosaic view provides two main operating modes: Live and Pause. It is possible to switch between both modes using the button at the bottom left of the page.



In **Live Mode**, the page is automatically updated at the end of each reading phase.

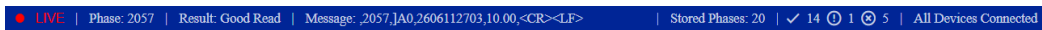
The phase result is shown by a colored box around the entire frame (green for Good Read, red for No Read, yellow for an Unreadable Code detected). Single images with a Good or an Unreadable code are colored as well.

The 20 most recent reading phases are stored in temporary memory and can be retrieved by switching to **Pause Mode** and using the arrow buttons (Pause Mode stops image collection).

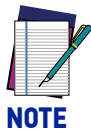
In Pause Mode, images can be zoomed in with the Zoom button and the mouse wheel, and saved in a single .png file using the Save button:



In both operating modes, details of the currently displayed phase are shown in the status bar:



A histogram bar next to each device name shows how often the reader has contributed to a successful decoding (statistics refer to the phases currently stored).



NOTE

The Mosaic view is intended to be a real-time monitoring tool. If the connection to the readers is not fast enough to support the required image transmission rate, some images might be skipped (a gray box is shown as a placeholder).

To ensure best performance, Ethernet connection for all readers in the array is recommended.

If no Ethernet connection is available for one or more Slave devices, the corresponding images will be retrieved through the ID-NET internal network at thumbnail resolution, with an image skip ratio that is dependent on the number of such devices.

CONFIGURATION USING DL.CODE

For a complete installation including additional configuration parameters such as image saving or Fieldbus communication setup, you must use the DL.CODE configuration software.



CAUTION

DL.CODE does not currently support Windows Embedded (often used in industrial PCs and/or PLCs).

To install and run DL.CODE you should have a Laptop or PC that meets or exceeds the following:

- 2.00 GHz or faster microprocessor
- Windows: 7, 8.1, or 10
- 1 GB RAM
- 2 GB hard disk for 64-bit machines; 1 GB hard disk for 32-bit machines
- 100 Base-T Ethernet
- One 19" or larger monitor (optimized for 1280x1024 resolution)

Quick Start

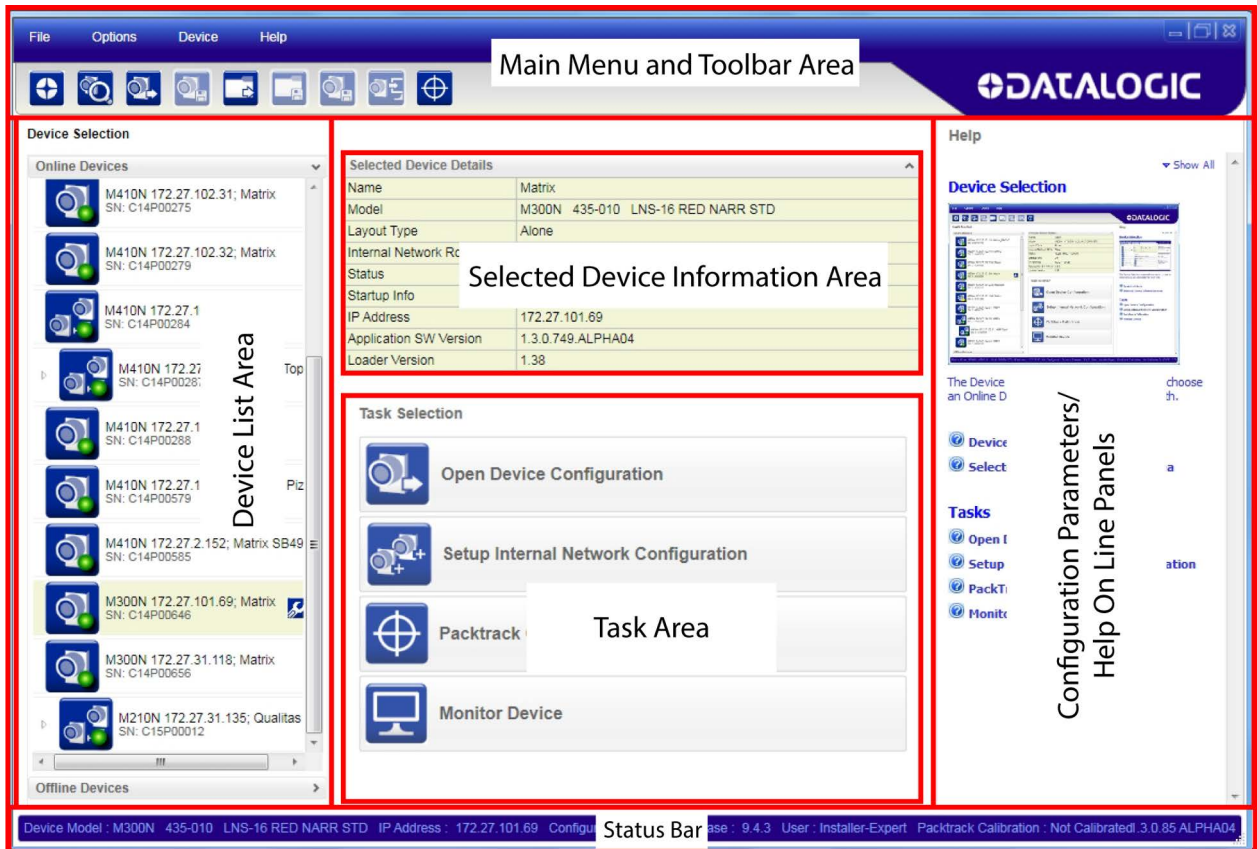


Figure 18 - Main window areas

To help you get started, here is an example configuration demonstrating the basic steps of DL.CODE configuration. To configure your device for your application, the following preliminary steps are assumed:

- The reading device(s) are installed and running.
- DL.CODE is installed and running.

Ethernet Device Discovery

The User Interface opens and displays a list of all the devices belonging to the Local Area Network. STS320 has a discovery feature to accomplish this task.

The discovery feature will also show devices not belonging to the LAN and display them in gray.

The following procedure will demonstrate an example configuration.

1. First, the device must be added to the LAN by aligning its IP Address to the network. The network administrator should provide valid LAN address(es).
2. Click on the device wrench icon to open the Device Environment Configuration window.
3. Change the Ethernet Settings (IP Address, Subnet Mask, Gateway Address etc.) according to the network requirements.
4. Click OK; the device will reappear in the list of Online Devices (in color) meaning it is now part of the LAN and can be configured. The new IP address will also be displayed.

- Double-click on or drag the device icon into the Selected Device Information Area. Details about the device will be displayed in this area.

**NOTE**

For Image Saving applications or to take full advantage of the Mosaic feature, you will need to connect the Slave readers to the network, one at a time, and assign IP Addresses to them.

**NOTE**

After device discovery, you are ready to configure your device through DL.CODE.

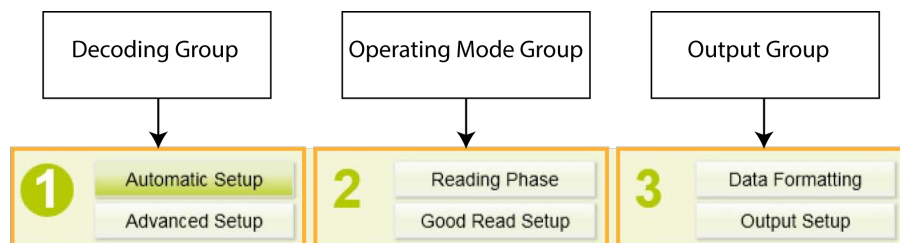
Device Configuration

**NOTE**

Especially for lengthy configurations, it is always good practice to periodically save the configuration to permanent memory (Save on Device) to avoid losing the configuration in Temporary Memory. You must give a name to the new configuration or overwrite an existing one (except for Default which cannot be modified).

When all the configuration parameters are set correctly and saved to the device, you can perform a Backup to File and/or to an External storage device (i.e. BM100 present inside the CBX500). See "[Backup and Restore Through DL.CODE](#)" on page 25.

DL.CODE is designed to simplify standard configuration by grouping the basic functions into three major parameter groups: Decoding, Operating Mode, and Output.



1. Decoding

This is preset for Tires applications. Under **Advanced Setup** some parameters can be modified, e.g. code symbologies, or gain and exposure time for applications other than Tires.

2. Operating Mode

- **Reading Phase:** this group manages the operating mode for image acquisition (default: Phase mode). A Fieldbus communication channel can be selected under this section.
- **Good Read Setup:** this group manages data collection (default: Code Combination).

3. Output

- **Data Formatting:** this group manages the output message to the Host. The Image Saving function can be enabled and managed under this section.
- **Output Setup:** this group manages the digital outputs as well as the Green/Red Spots and 360° Feedback. Control from Fieldbus Master can be also be managed under this section.

Backup and Restore Through DL.CODE

DL.CODE allows Backup and Restore to be performed to/from the configuration PC via file and to the BM100 external storage device inside the CBX500 (both are recommended).

DL.CODE provides complete backup and restore functions (Configuration and Environmental parameters):

For Master Readers in ID-NET Master/Slave networks:

- Backup and Restore functions provide parameter storage of only the Startup Configuration for the Master and all Slaves present in the network.



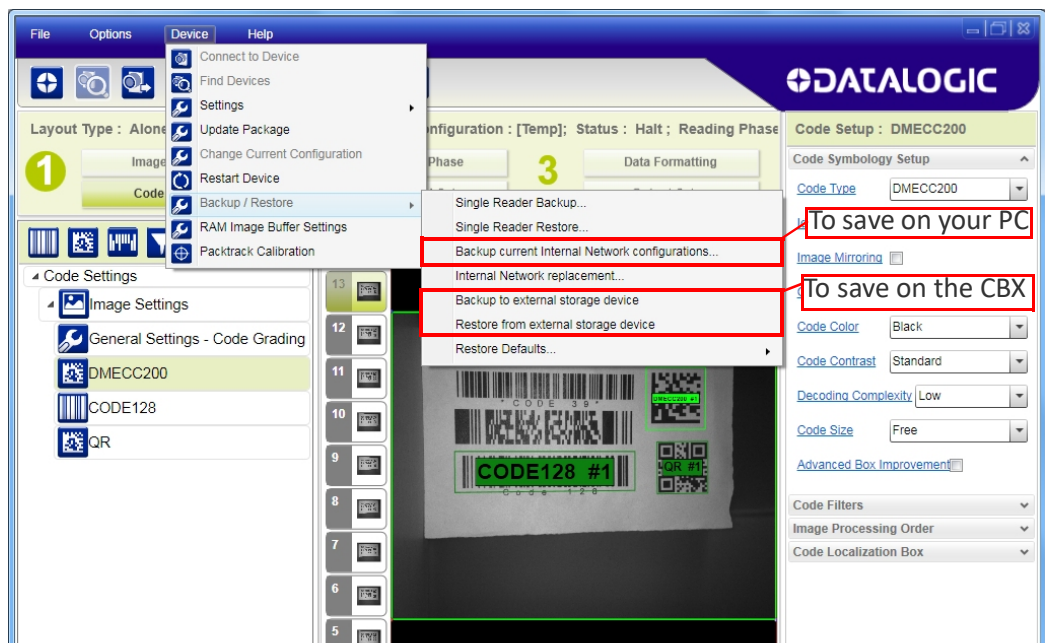
CAUTION

For Master/Slave networks any other configurations (jobs) stored in the device memory will not be backed up. Therefore, all jobs other than the startup configuration will be overwritten (erased) upon a restore. It is strongly recommended to save all configurations to backup files.



NOTE

Before executing a Backup to a BM100 backup module make sure the Write Protection switch is set to Unlocked.



Backup

To perform a **Backup**, from the DL.CODE Device menu, select **Backup to external storage device** and follow the procedure; then perform a backup selecting **Backup current Internal Network configurations** (to a file on PC) and follow the procedure.



NOTE

After executing the Backup to the BM100 module, make sure to lock the Write Protection switch.

After performing the Backup installation is completed. You can check the station performance using the DL.CODE Monitor or the Web Monitor.

Restore

To perform a **Restore**, from the DL.CODE Device menu, select **Restore from external storage device** and follow the procedure; then perform a backup selecting **Internal Network replacement** (from a file on PC) and follow the procedure.

Replacement



CAUTION

The replacement device must be the exact same model as the device it is replacing.

The **Restore** function also provides easy and secure Single Device Replacement:

1. Remove the device to be replaced by loosening the screws on the fast bracket, mounting the fast bracket on the new device, and fixing it to the array mounting bracket making sure it is aligned, (screws fully seated into the end of the fast bracket slots). Refer to the Product Reference Guide for more details.
2. Connect the new device (make sure the new device has been previously set to factory default).
3. Run the Restore procedure by selecting **Restore from external storage device** item (see: Restore procedure).



NOTE

In case of Backup or Restore operation failures, error messages will be displayed in the Monitor Diagnostic page.

CHAPTER 5

TROUBLESHOOTING

GENERAL GUIDELINES

- When wiring the device, pay careful attention to the signal name (acronym) on the CBX500 spring clamp connectors (see [Electrical Connections, starting on page 9](#)).
- If you need information about a certain reader parameter you can refer to the DL.CODE™ Help On Line.
- If you are unable to fix the problem and you are going to contact your local Datalogic office or Datalogic Partner or ARC, we suggest providing (if possible): Application Program version, Parameter configuration file, Serial Number and Order Number of your reader.

| Troubleshooting Guide for STS320 Solutions | |
|---|---|
| Problem | Suggestion |
| <p>Presence Sensor: the sensor (light barrier) is not working correctly.</p> | <ul style="list-style-type: none"> ▪ Check the LEDs on the presence sensor. If the sensor has power, a green LED must be lit. If the sensor has a free path (view) to the reflector, only this green LED should be lit. If a yellow LED is lit together with the green one, please check the mechanical position and orientation of the sensor and reflector. ▪ Every time the yellow LED on the sensor is lit, the corresponding LED in the CBX500 connection box must be lit. For Trigger this must be the yellow LED and for the Input 2 the green one. If this is not the case, please check the wiring of the sensors. |
| <p>No Presence Sensor: No trigger signal from the PLC (if no sensor is used)</p> | <ul style="list-style-type: none"> ▪ If a signal from the PLC is correct in the CBX500 connection box, a yellow LED (Trigger) must be lit inside of this box. If this is not the case, please check the wiring and the output of the PLC. |
| <p>No Trigger Signal at Reader: Is this trigger signal correctly recognized by the reader?</p> | <ul style="list-style-type: none"> ▪ If a reading signal (trigger signal) is present and active from the sensor or PLC and the LEDs in the CBX500 connection box are working correctly, the trigger signal LED on the reader must also be lit. As long as this LED is lit, the readers try to read a code. If this LED does not light up, please replace the reader and send it to repair. |

Troubleshooting Guide for STS320 Solutions

| Problem | Suggestion |
|---|---|
| Does the internal lighting system work correctly? | <ul style="list-style-type: none">▪ If a trigger signal is active and no code is present under the system, all readers must flash blue. If this is not the case, please replace the reader and send it to repair. |
| Do the readers read codes? | <ul style="list-style-type: none">▪ Place a correctly positioned code under each reader. If the reader has read the code, the GOOD read (green) LED must light up. A green spot must also light up on the code surface. If this is not the case, please replace the reader and send it to repair. |

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