

TS 2 Traffic Control Manual

Stop Gates, Rockers, and Proximity Switches

Installation and Maintenance Guide

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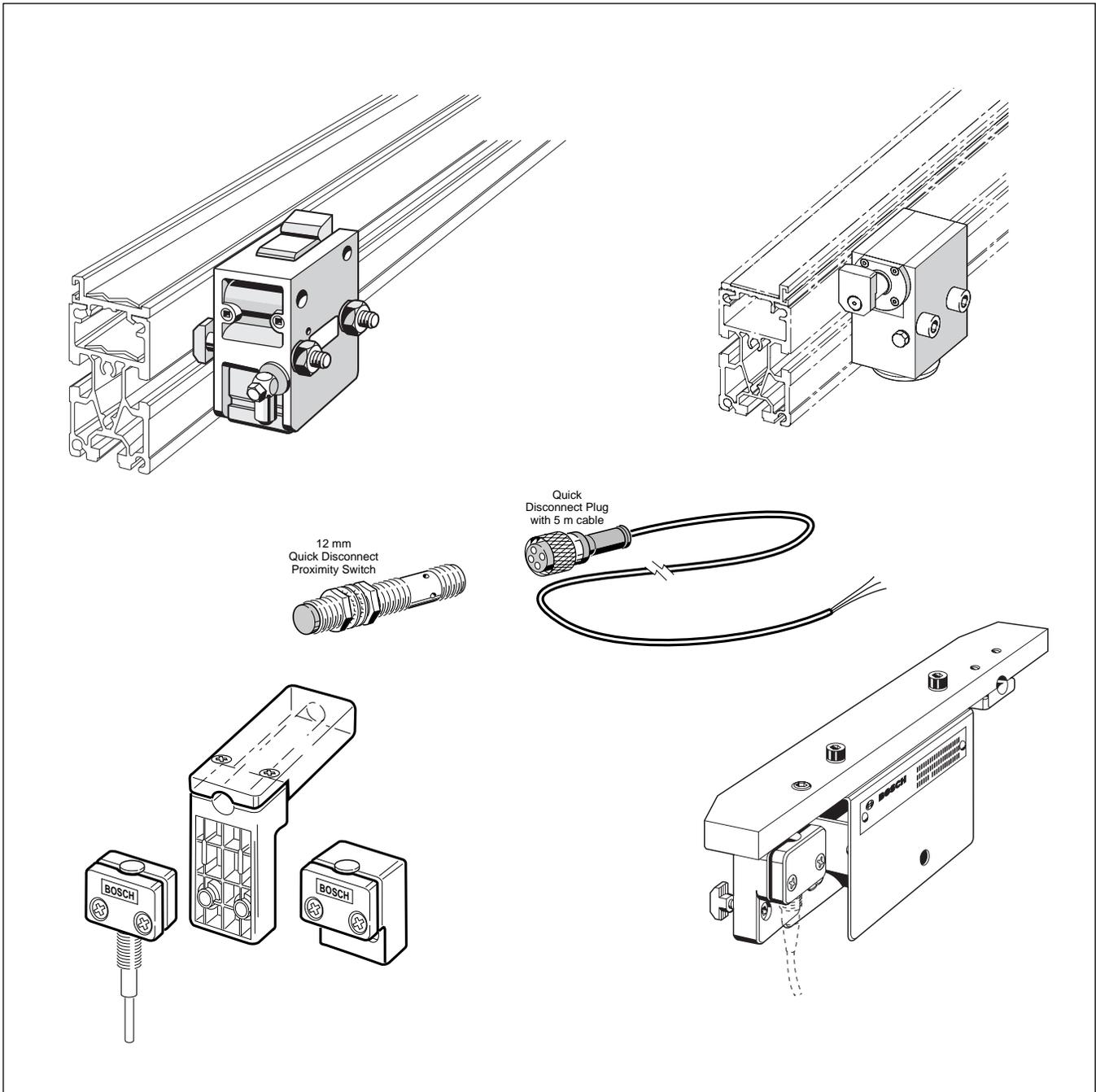


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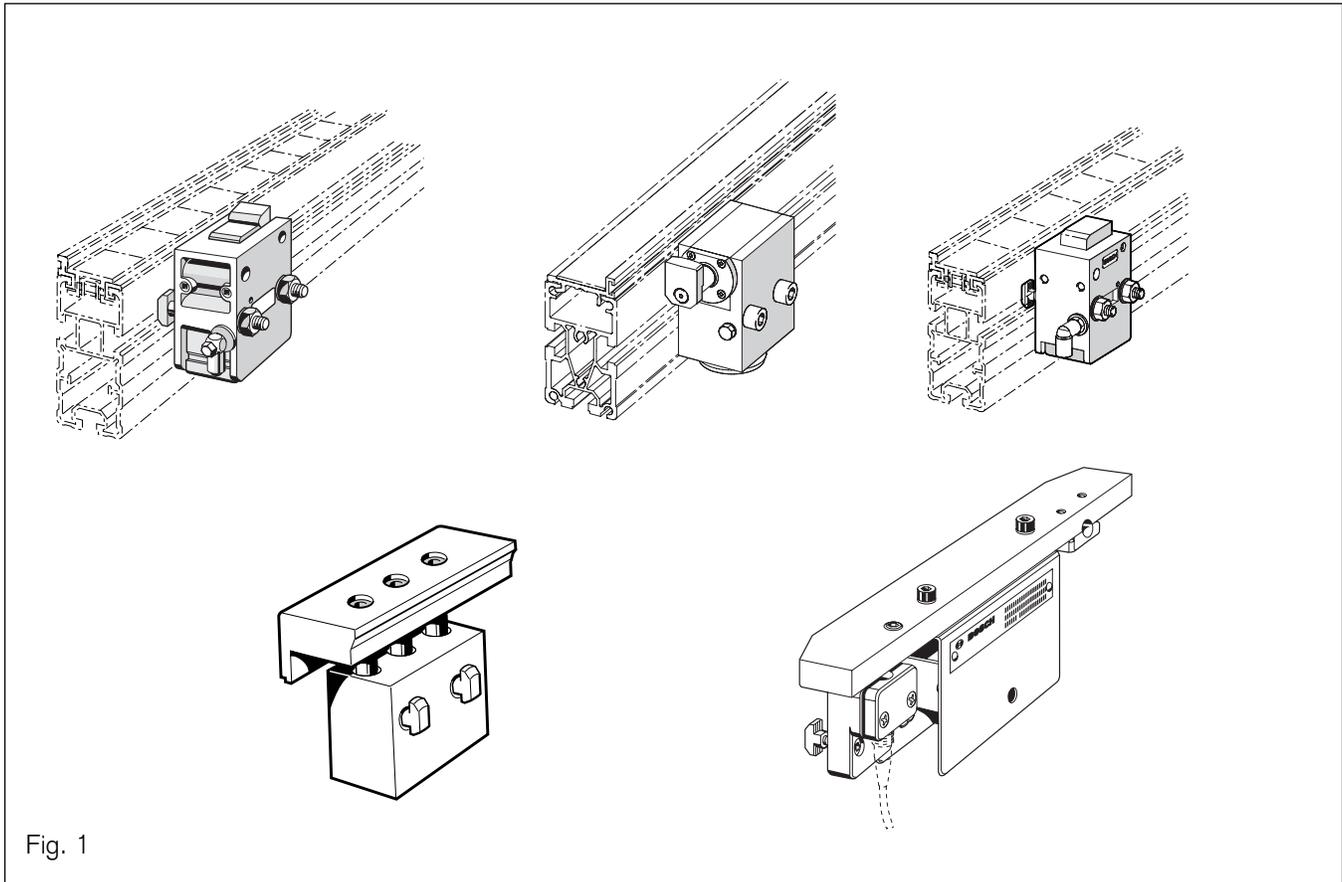


Fig. 1

Introduction

Stop gates are used to stop and separate workpiece pallets on the conveyor so that work or positioning functions may be performed. Bosch stop gates are pneumatically powered and mount directly to the side of the conveyor profile using the included mounting hardware.

Three major types of stops are available: standard stop gates, which halt workpiece pallets on the leading or trailing edge (max. load up to 800 kg); cushioned stop gates (shown in Fig. 1), which reduce pallet impact by up to 80% at stops, and rocker stops, which are used at the end of transverse sections and at intersections.

More detailed information on each type of stop is included in the technical data section.

Installation instructions and application examples began on page 14.

Technical Data

Standard Stop Gates Model VE 2

Standard stop gates stop workpiece pallets on the leading or trailing edge, with maximum loading capacity of up to 75 kg @ 12 m/min. A standard stop gate uses pneumatic power to lower the stop and release the pallet, while a return spring raises the stop back up.

A double acting kit can also be added to convert the stop gate to a pneumatic return, creating a double acting pneumatic stop.

Pneumatic requirements

Air connection	Pushlock-type air connectors for 4 mm (5/32") plastic tubing
Air pressure	4 - 6 bar (58 - 87 psi)
Air requirements	Oiled, filtered air

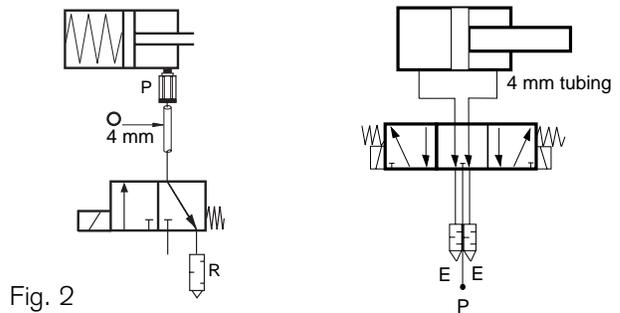


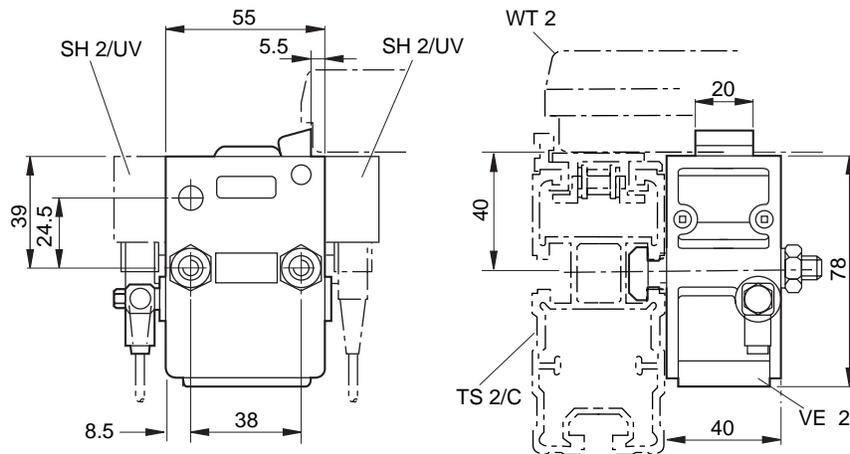
Fig. 2

Standard Stop Gate

0842 900 300 Standard Stop Gate Kit

Double Acting Kit

3842 117 929 Stop Gate Double Acting Kit



Note: shown with TS 2/C profile.

Fig. 3

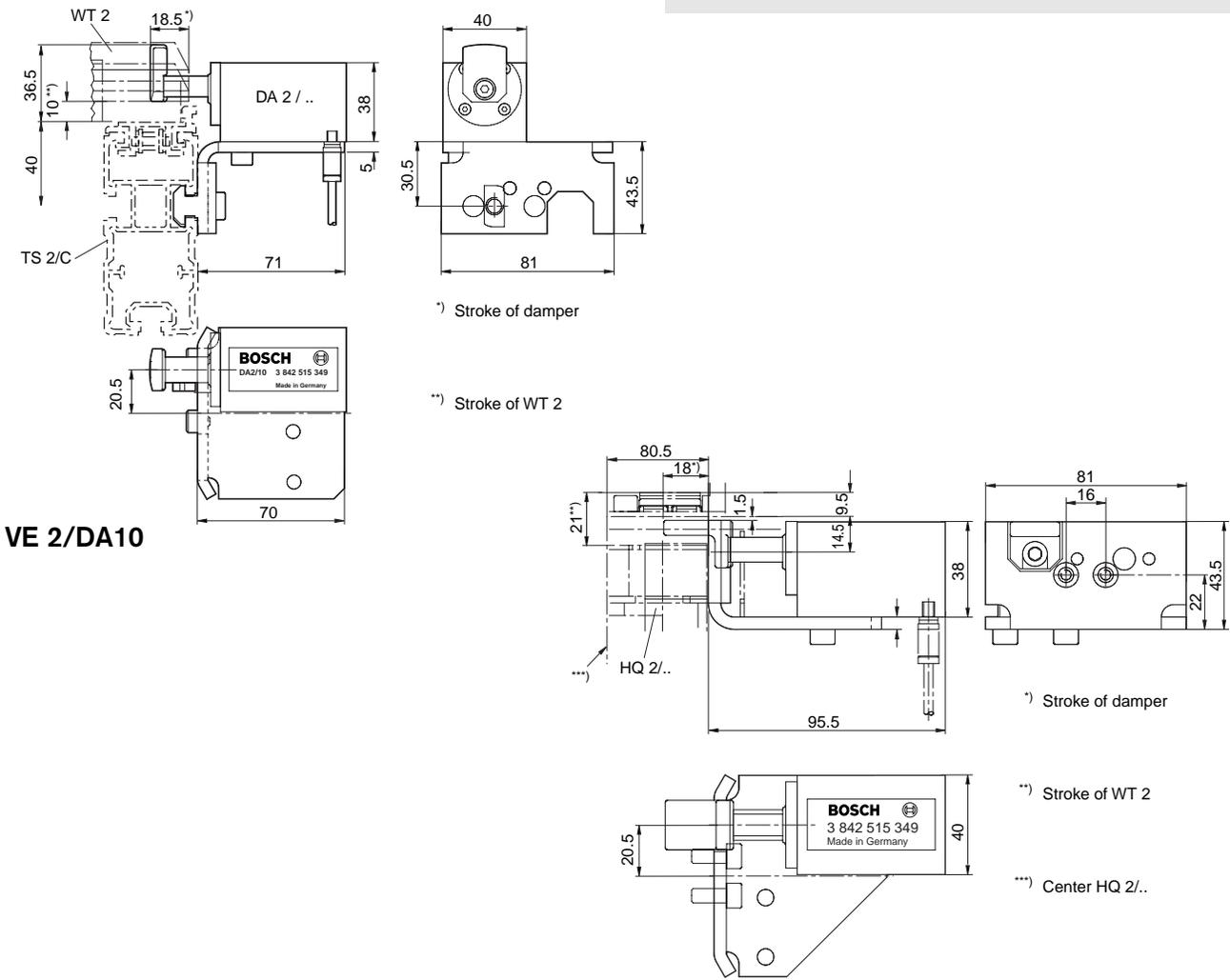
Cushioned Stop Gates

Cushioned stop gates are used when handling fragile or shock-sensitive components. They reduce impact by up to 80%, and are infinitely adjustable.

Six different types are available, with capacities from 1 to 35 kg at up to 18 m/min line speed. Pallet accumulation is not permitted.

Cushioned Stop Gates

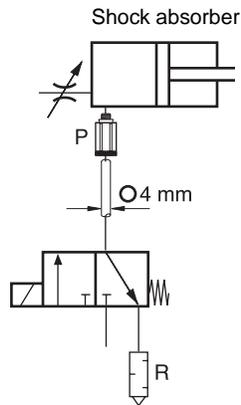
In-Line	Model	Capacity	Mounts on:
3842 515 345	VE 2/D10	1 - 10 kg	Rail
3842 515 347	VE 2/D30	3 - 35 kg	Rail
Short Stroke	Model	Capacity	Mounts on:
3842 512 365	VE 2/SS4	4 kg	Rail
3842 512 366	VE 2/SS6	6 kg	Rail
Junction	Model	Capacity	Mounts on:
3842 515 349	VE 2/DA10	1 - 10 kg	LTU or Rail
3842 515 351	VE 2/DA30	3 - 35 kg	LTU or Rail



VE 2/DA10

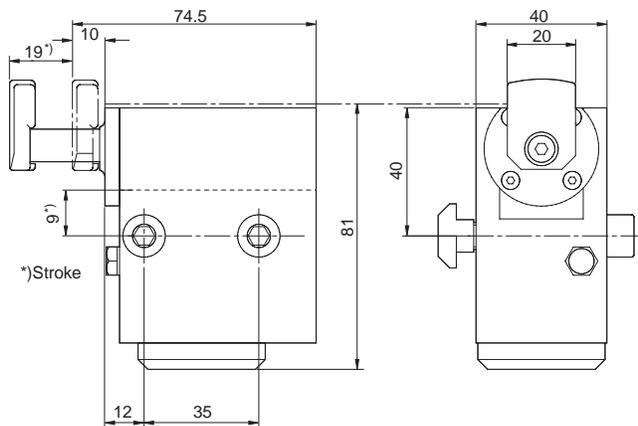
VE 2/DA30

Fig. 4

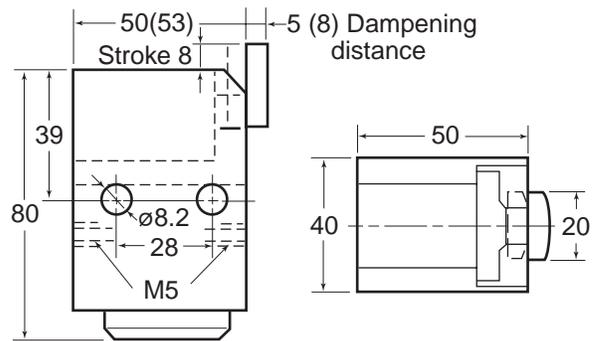


Air connection	Pushlock-type air connectors for 4 mm (5/32") plastic tubing
Air pressure	4 - 6 bar (58 - 87 psi)
Air requirements	Oiled, filtered air
Table 2: Pneumatic requirements	

Fig. 5



VE 2/D10 and VE 2/D30



VE 2/SS4 and VE 2/SS6

Fig. 6

Bi-Directional Stop Gate

Bi-directional stop gates are virtually identical to a standard stop, except that they are used with pallets moving in reverse direction, such as when feeding pallets back in from a spur line.

Bi-Directional Stop Gate VE 2/ST

3842 515 844 Bi-Directional Stop Gate

Air connection	Pushlock-type air connectors for 4 mm (5/32") plastic tubing
Air pressure	4 - 6 bar (58 - 87 psi)
Air requirements	Oiled, filtered air

Table 3: Pneumatic requirements

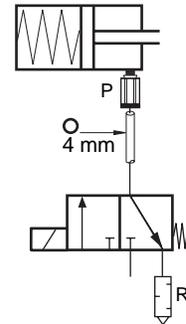


Fig. 7

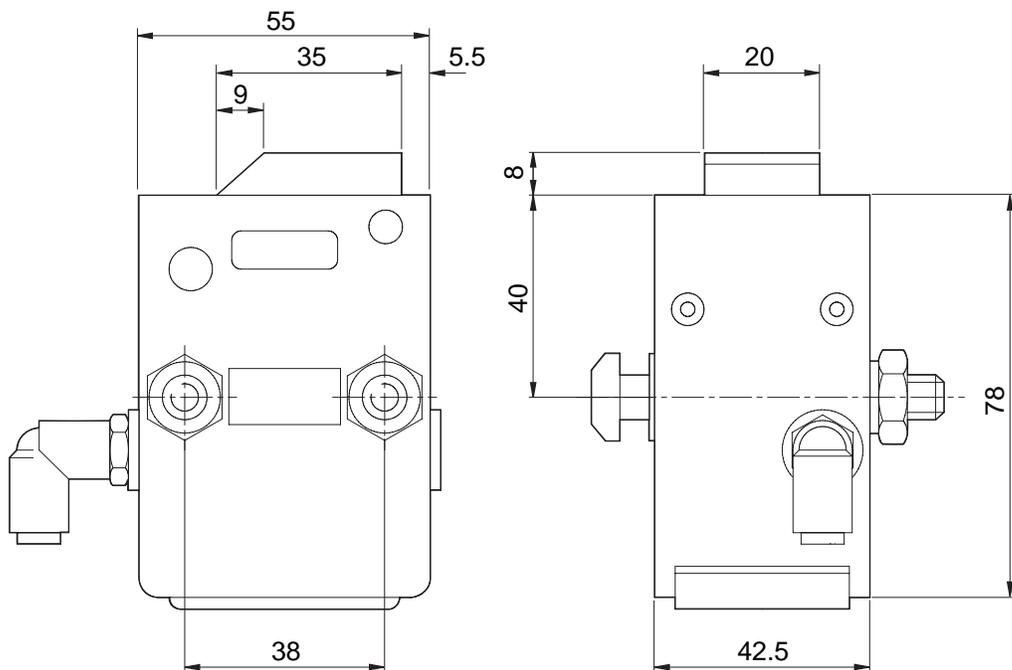


Fig. 8

Pop-Up Stop Gate

Pop-up stops are used for stopping pallets on a lift-transverse unit when standard rockers cannot be used, such as between parallel lines. It is pneumatically raised and lowered via return springs. A proximity sensor (not included) is used to sense that the stop is raised.

Air connection	Pushlock-type air connectors for 8 mm (5/16") plastic tubing
Air pressure	4 - 6 bar (58 - 87 psi)
Air requirements	Oiled, filtered air

Table 4: Pneumatic requirements

Pop-Up Stop Gate VE 2/VA

Part No:	Conveyor Width	Stop Length
8981 526 028	160 mm	80 mm*
3842 191 721	240 mm	160 mm
3842 191 722	320 mm	240 mm
3842 191 723	400 mm	320 mm
3842 191 724	480 mm	400 mm

* Cannot be used with a BS 2 with a large drive head.

Fig. 9

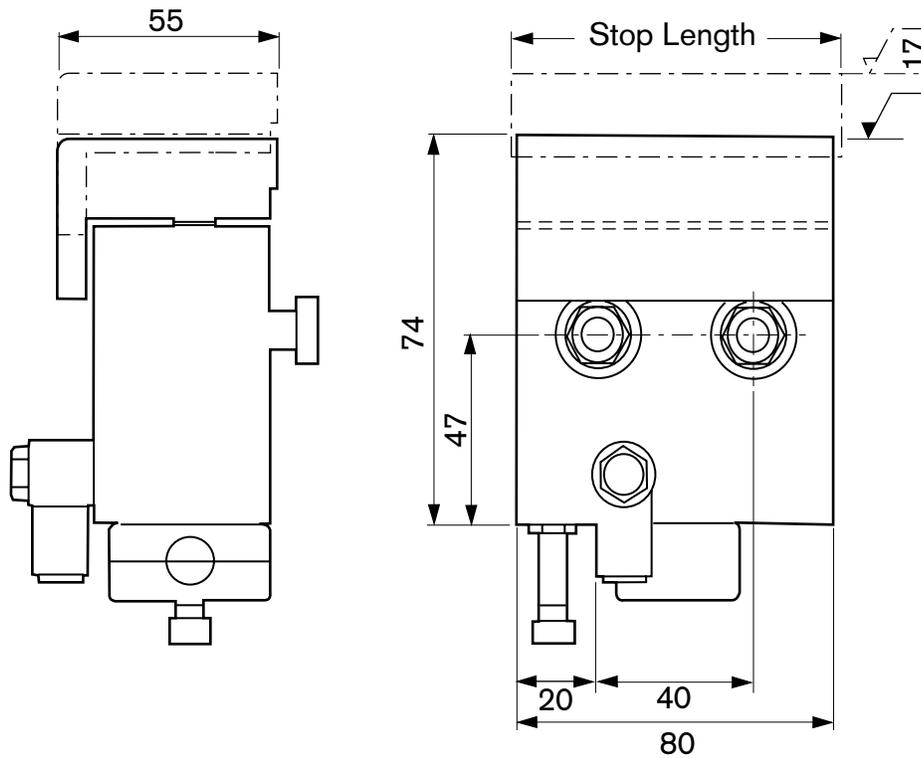


Fig. 10

Rocker Stops

Rocker stops serve two functions: they detect pallets at intersections or in accumulation situations and stop pallets at the end of lift-transverse units and track roller segments.

The cushioned rocker stop kit allows reduced impact as well as the ability to sense pallet movement directionally. The cushioned stop gate and proximity sensors are not included and must be ordered separately.

Rocker kits for use with pallets of greater than 560 mm in length include two rocker assemblies with an extended striker bar, and mounting kit.

Cushioned Rocker

3842 512 368 Cushioned rocker kit

Standard Rockers (WI 2)

Part No.	Pallet length	Rocker bar length
3842 348 780	160 mm	320 mm
3842 348 781	240 mm	320 mm
3842 348 782	320 mm	400 mm
3842 348 783	400 mm	480 mm
3842 348 784	480 mm	560 mm
3842 348 785	560 mm	640 mm*
3842 348 786	640 mm	720 mm*
3842 348 787	720 mm	800 mm*
3842 348 788	800 mm	880 mm*

* Includes two rocker bars and mounting kits.

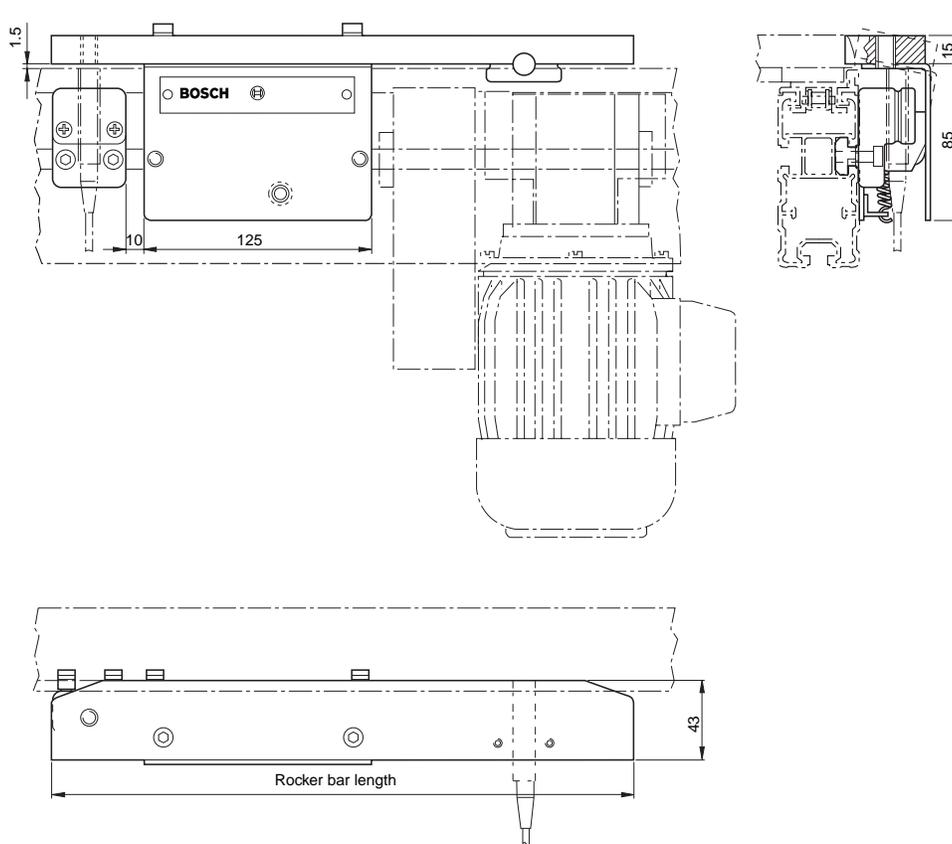


Fig. 11

Accumulation Control Kit

The accumulation control kit is designed to prevent overloading of a stop gate by detecting pallet accumulation. It consists of a rocker to detect pallets, a standard stop gate to separate the flow, a pneumatic valve, and the required mounting hardware. It is pneumatically controlled and does not require host control logic.

Accumulation Control Kit
3842 890 233 Accumulation Control Kit

Pneumatic requirements	
Air connection	Pushlock-type air connectors for 4 mm (5/32") plastic tubing
Air pressure	4 - 6 bar (58 - 87 psi)
Air requirements	Oiled, filtered air

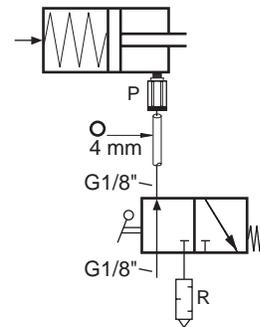


Fig. 12

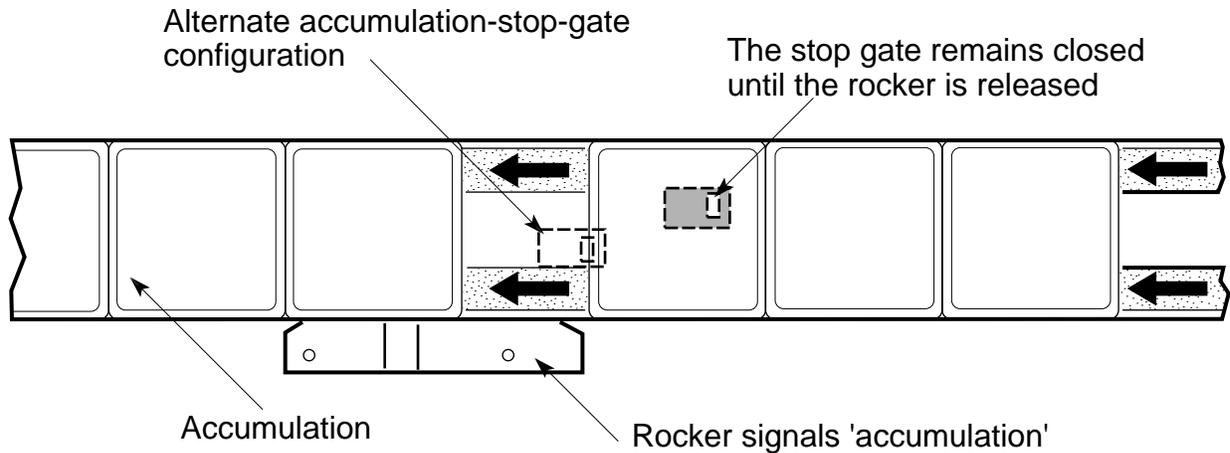


Fig. 13

Traffic Control Kit

For traffic control of pallets in and out of lift-position units, as well as in certain other situations, the use of two standard VE 2 stop gates and three proximity switches with mounting brackets is recommended. All components are available separately, or as a kit (with or without proximity switches). For dimensional information and mounting, refer to the individual components. Included components are:

Traffic Control Kit

8981 014 663 Traffic Control Kit w/o Proximity Switches
3842 211 354 Traffic Control Kit w/ three Proximity Switches

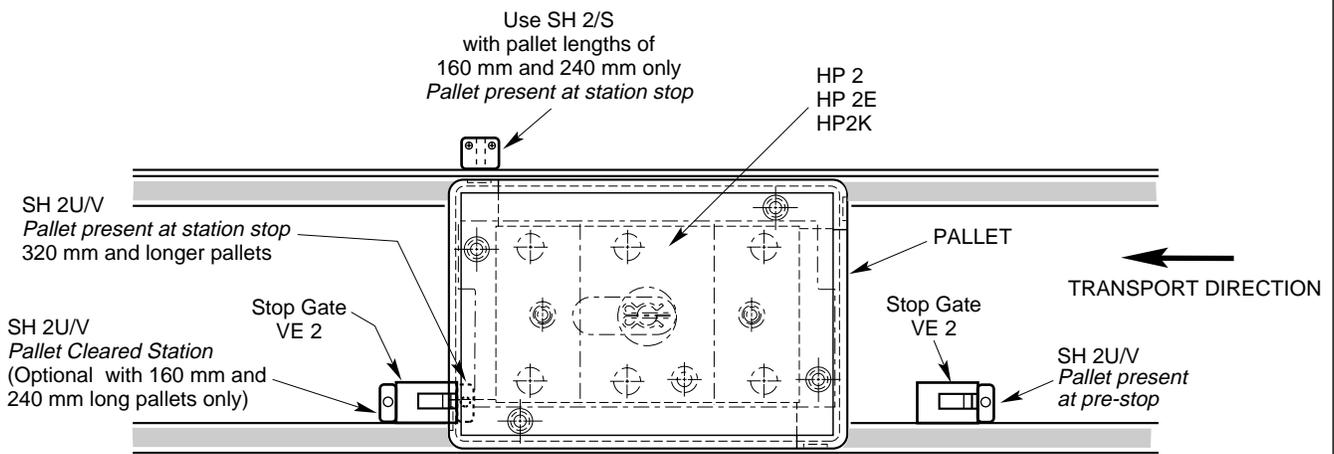


Fig. 14

Proximity Switches

Proximity switches, available as both standard and quick-disconnect versions, detect workpiece pallet presence by sensing the exciter plates mounted on the bottom and sides of the pallet frame. These normally open, 24 VDC, short-circuit protected switches are PNP (sourcing) and have a 12 mm threaded body. Sensing range is 4 mm (unshielded). Standard proximity switches (Fig. 15) include 5 m of 3 conductor cable. Quick-disconnect proximity switches (Fig. 16) are designed to work with a quick disconnect plug and allow for faster assembly and service.

Standard Proximity Switch

8981 004 462 12mm, 10-30 VDC Proximity Switches w/ 5 m of 3 Conductor Cable

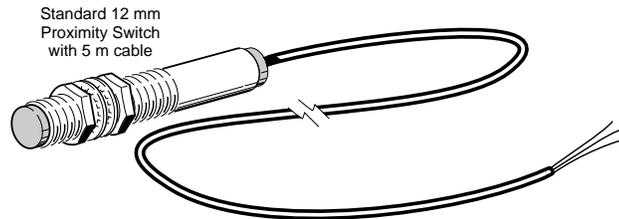


Fig. 15

Quick- Disconnect Proximity Switch

8981 533 326 12mm, 10-30 VDC Quick-Disconnect Proximity Switch
 8981 008 498 Quick-Disconnect Plug with 5 m of 3 Conductor Cable

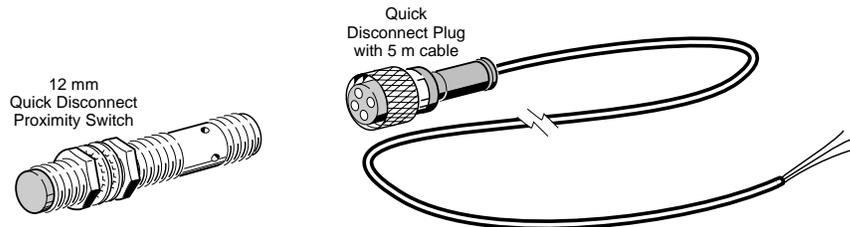


Fig. 16

Proximity Switch Brackets

There are six standard brackets for mounting proximity switches, depending on pallet flow and function. All switch brackets are made of polyamide and include mounting hardware.

They include:

SH 2/U (Fig. 17)

- Mounts to inside of conveyor profile.
- Senses pallet position from below.

SH 2/UV (Fig. 18)

- Mounts to stop gate.
- Senses pallet position from below.

SH 2/S (Fig. 19)

- Mounts to outside of conveyor profile.
- Senses pallet from the side.

SH 2/ST (Fig. 20)

- Mounts to outside of conveyor profile.
- Senses pallet position from the side.
- Include transparent protective switch cover.

SH 2/SF (Fig. 21)

- Mounts to outside of conveyor profile.
- Senses pallet position from the side.
- Designed for use with low profile switches.

SH 2/EP (Fig. 22)

- Mounts to outside of conveyor profile.
- Senses pallet position from the side, parallel to line flow, such as at corners.
- Blocks conveyor path in perpendicular to the sensing direction.

Proximity Switch Brackets

3842 892 190	SH 2/U
8981 000 175	SH 2/UV
8981 000 176	SH 2/S
3842 168 850	SH 2/ST
3842 168 840	SH 2/SF
3842 890 592	SH 2/EP

SH 2/U

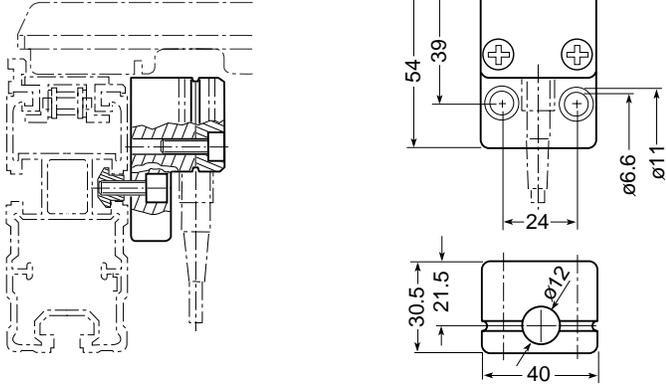


Fig. 17

SH 2/ST

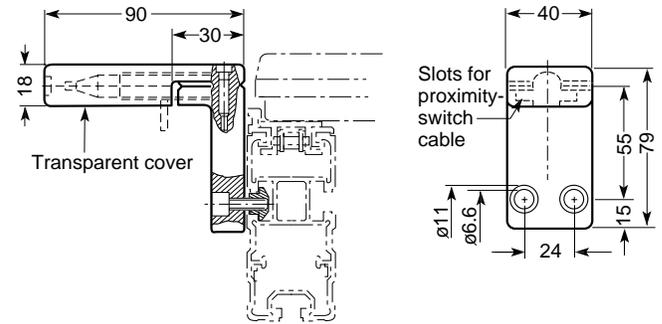


Fig. 20

SH 2/UV

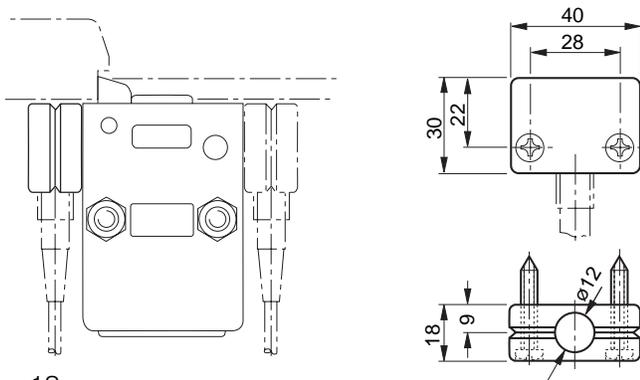


Fig. 18

SH 2/SF

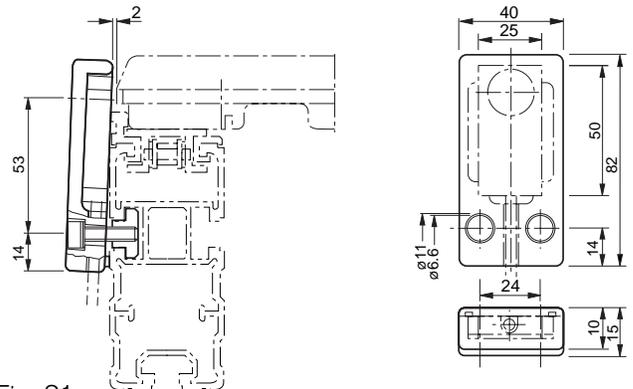


Fig. 21

SH 2/S

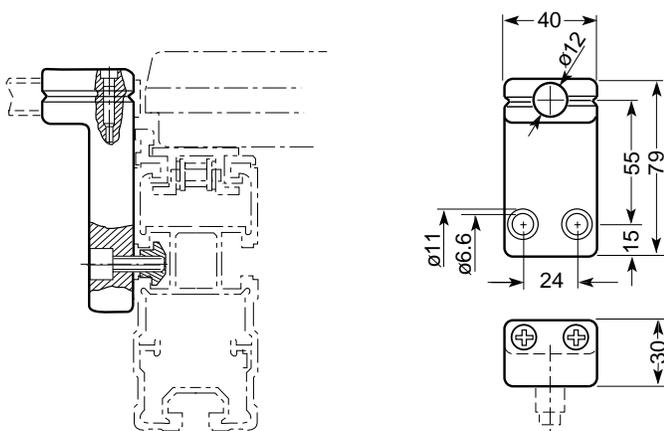


Fig. 19

SH 2/EP

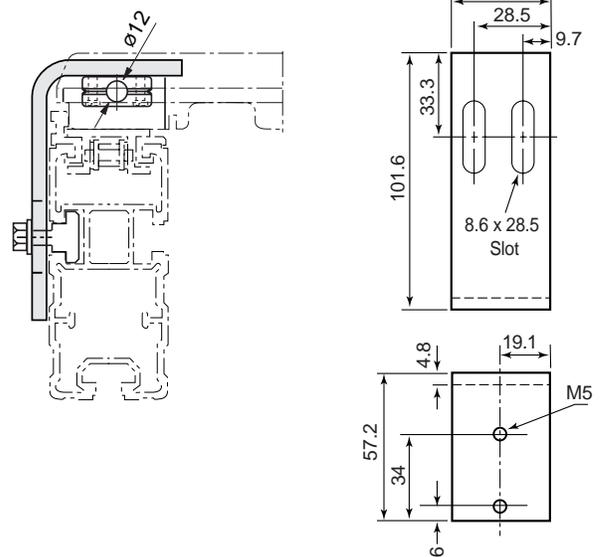


Fig. 22

Installation

General installation tip

For most applications, stops and proximity switch brackets, as well as most standard Bosch accessories, attach to the conveyor profiles using the T-slot principle. For T-bolts, insert the T-bolt into the slot (A), and tighten down the hex nut. As it tightens, it will turn the T-bolt 90° in the slot (B), creating a friction lock (C). The same principle applies to T-nuts. The maximum allowable torque is 25 Nm (18.5 ft-lbs).

Assembly tip: T-bolts also have a mark on the end of the threaded shaft that will be perpendicular to the T-slot when the bolt is in its locked position.

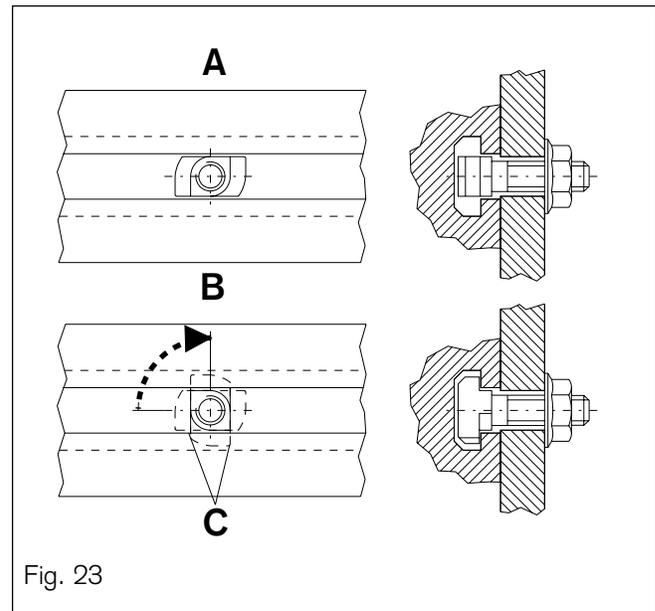


Fig. 23

Air connection

The pneumatic diagram, connection type, and air requirements for each stop gate type are included on the overview page for that model.

NOTE: To maximize stop gate service life and ensure proper operation, always use filtered, oiled air within the pressure ranges indicated.

Standard, bi-directional, and in-line cushioned (including short-stroke) stop gates

1. Determine and mark the position on the conveyor rails where the stop gate should be installed, and whether the pallet is to be stopped on the leading or trailing edge.
Be sure to note pallet flow and potential accumulation problems, including blocking other modules and sensors.
2. If a proximity switch will be installed on the stop gate (bracket type SH 2/UV), attach the bracket loosely with the included screws to the appropriate side of the stop gate, depending on pallet flow and leading/trailing edge configuration.
3. Use a 13 mm wrench to attach the stop gate to the conveyor rail with the included fastening hardware. Tighten to 25 Nm. Slide the proximity switch barrel into the proximity switch bracket, adjust until it senses the pallet but does not interfere with pallet movement, and tighten the proximity switch bracket screws.
3. Make all air connections, noting the pneumatic requirements. If using a double acting stop gate kit, connect it at this time (standard stop gates only).

Adjusting the cushioning for cushioned stops

All TS 2 cushioned stops provide for infinitely adjustable cushioning within their respective range so that you can tailor the stop resistance to the pallet load.

To adjust the cushioning, use a screwdriver to turn the stop gate adjustment screw to set the desired amount of cushioning. You will have to experiment in order to find the ideal degree of cushioning based on pallet weight and conveyor speed.

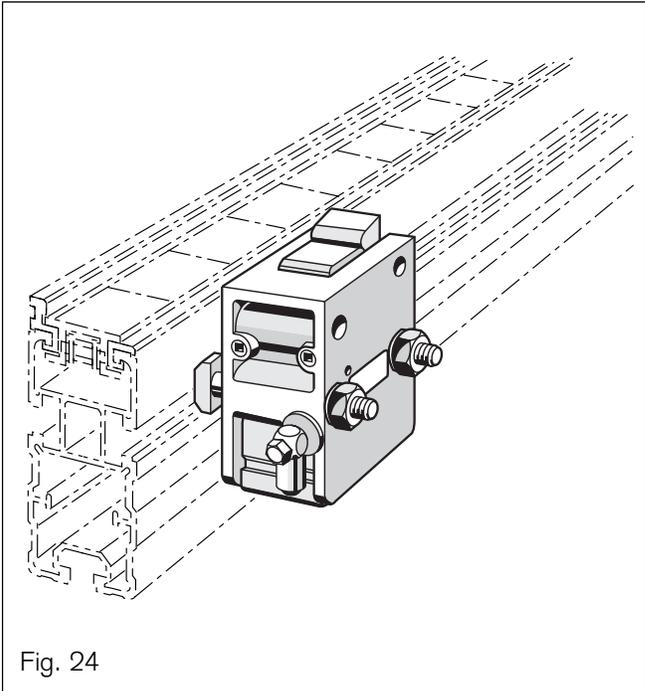


Fig. 24

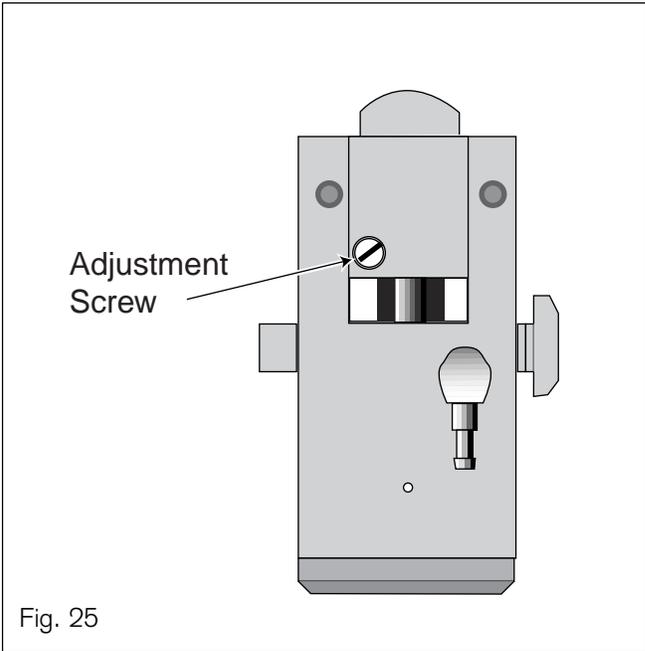


Fig. 25

End-mount cushioned stop gates

1. Determine the mounting position of the stop gate. End-mount cushioned stop gates are typically mounted at intersections where a lift transverse unit feeds the pallet on or off the main line. The stop should be centered on the pallet's leading edge.
2. Attach the stop gate to the T-slots on the conveyor rail using the supplied fasteners.
3. Connect the air supply.
4. Install the "cushioning stroke end point" proximity switch in the mounting hole.

Adjusting the cushioning for cushioned stops

All TS 2 cushioned stops provide for infinitely adjustable cushioning within their respective range so that you can tailor the stop resistance to the weight of your product.

To adjust the cushioning, use a screwdriver to turn the stop gate adjustment screw to set the desired amount of cushioning. You will have to experiment in order to find the ideal degree of cushioning based on pallet weight and conveyor speed.

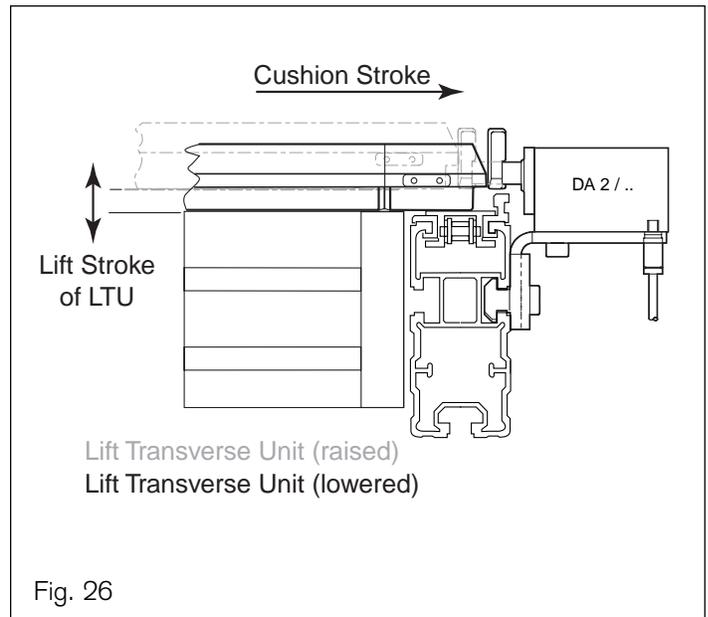
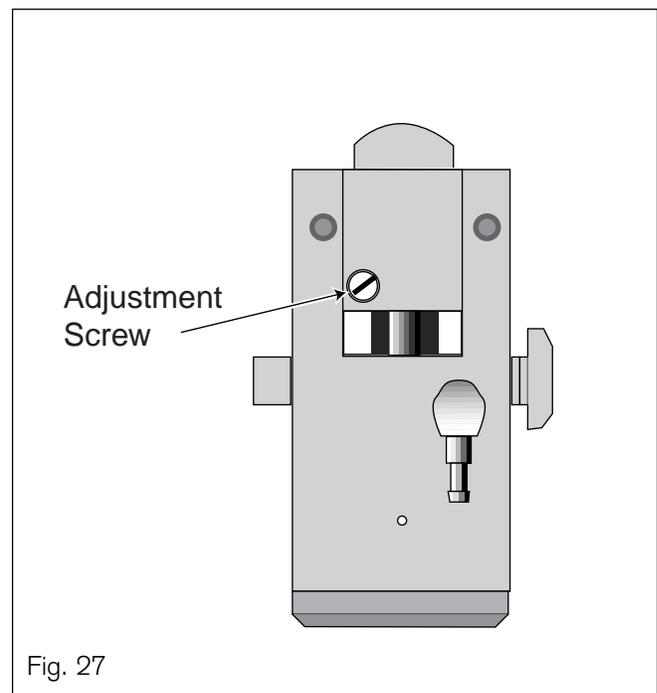


Fig. 27



Pop-up stops

1. Determine the mounting position (typically at the end of a lift-transverse unit section).
2. Mount the pop-up stop to the conveyor rail using the supplied fasteners, noting pallet flow. See Figure 28 below for proper stop orientation.
3. Install the proximity switch for "up-position" sensing in the socket on the body of the stop.
4. Connect the air supply. Please note that the pop-up stop requires an 8 mm push-lock connection.

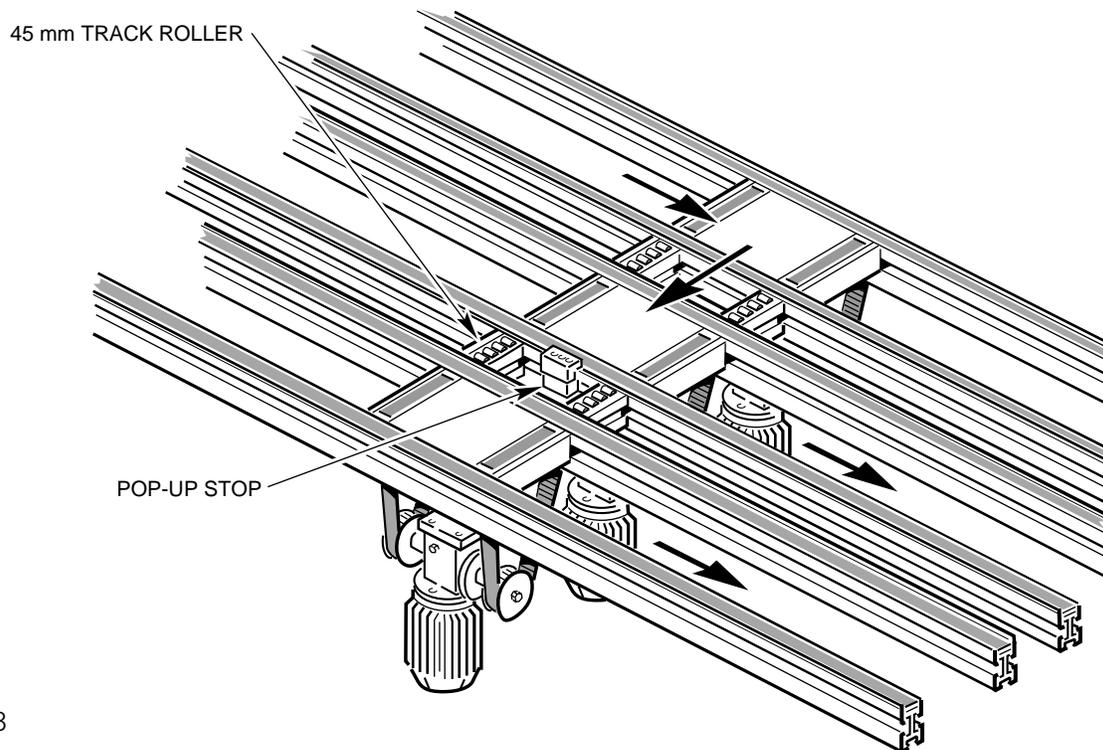
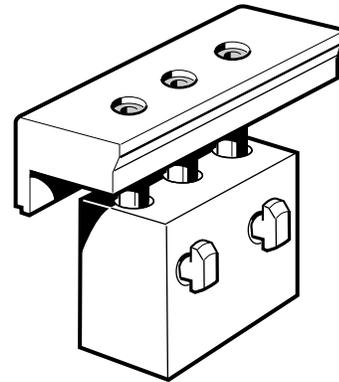


Fig. 28

Rocker

Mount the rocker to the conveyor (Fig. 30)

Determine the desired mounting point. The rocker should be centered to the pallet, especially when installed at an intersection. The overall length of the rocker should equal the length of the pallet rail that will contact it.

1. For standard rockers, attach the pivot of the rocker assembly to the outside conveyor rail with the supplied fasteners. Tighten to 25 Nm. Rockers for larger pallet sizes include two separate pivots and a striker bar to connect them together.
2. Install the proximity switch in the switch holder included with the rocker and mount to the conveyor profile directly below the exciter on the rocker (see drawing at right).

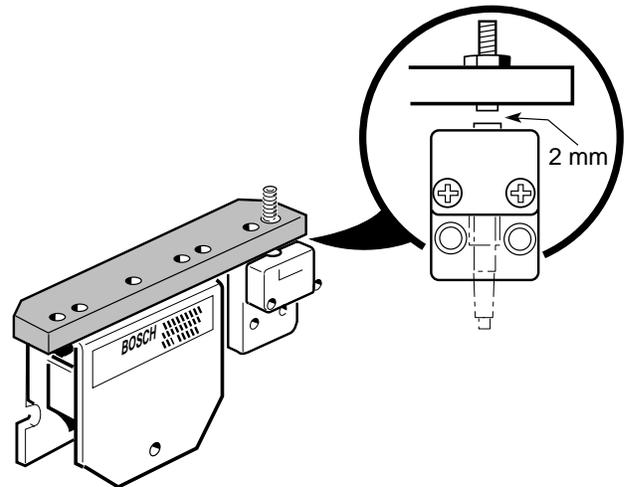


Fig. 29

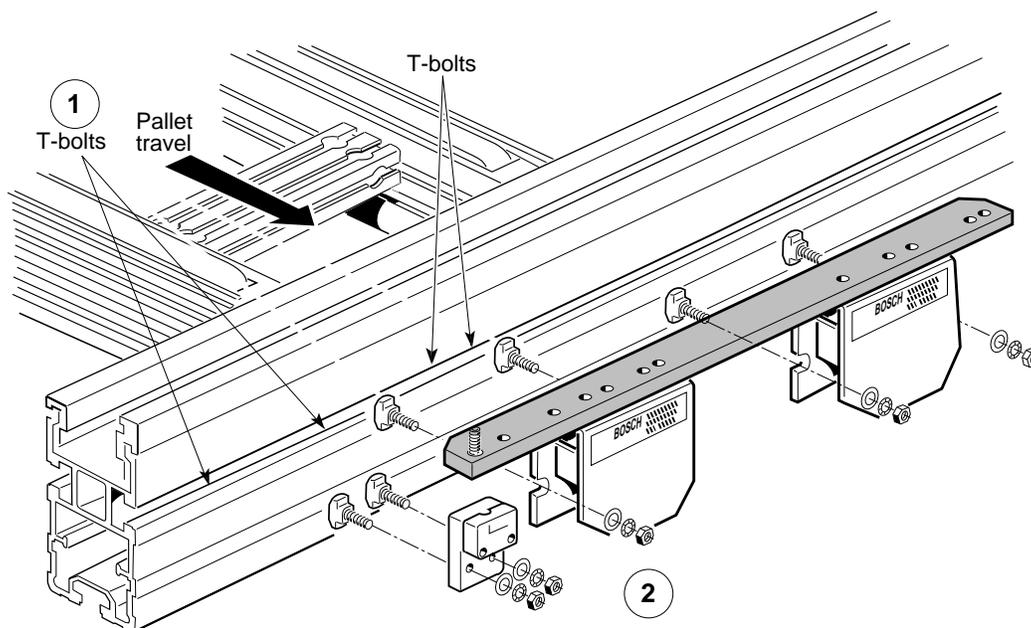


Fig. 30

1. For cushioned rockers, attach the cushioned stop at the center point of the rocker length with the supplied fasteners. Tighten to 25 Nm.
2. Connect the proximity switch and air connections.
3. Mount the rocker pivots to the outer conveyor rail, one on each side of the cushioned stop. Tighten to 25 Nm.
4. Install the proximity switch in the switch holder included with the rocker and mount to the conveyor profile directly below the exciter on the rocker (see drawing at right).

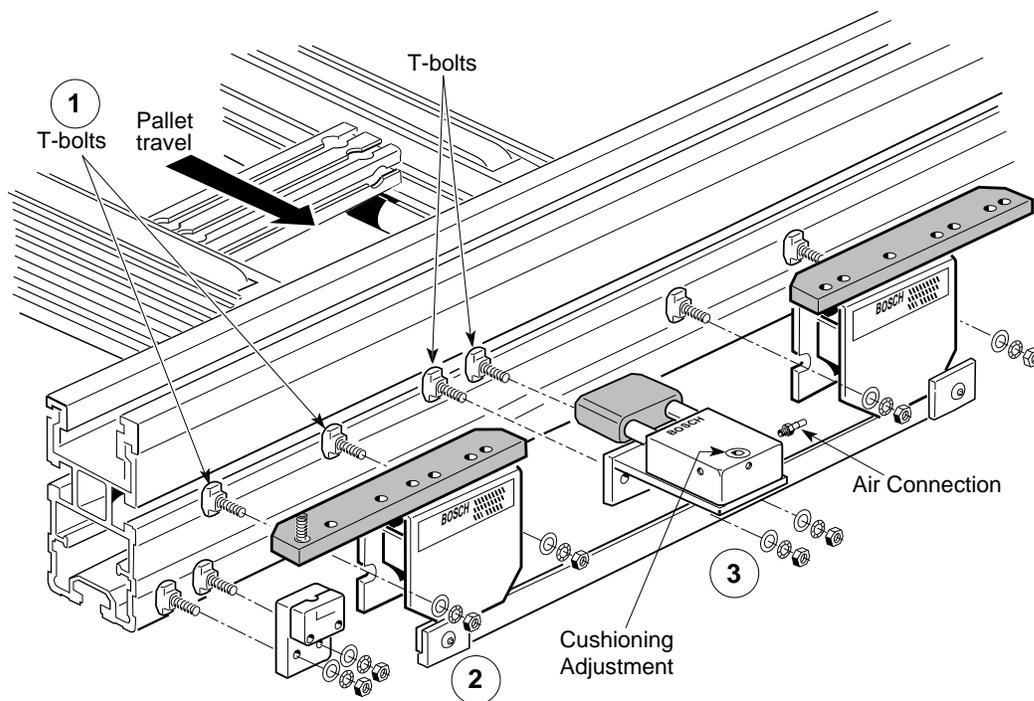


Fig. 31

Proximity Switches and Brackets

Proximity switches are used to detect pallet presence at intersections, stop gates, and other "decision making" locations. The proximity sensors detect a pallet by inductively reading a metal exciter plate on the pallet frame, and have a non-shielded detection range of approximately 4 mm. A red LED at the switch base will light when the switch is activated.

Standard proximity switches have five meters of cable wired directly into the switch barrel. If a standard switch is replaced, the wiring from the switch to the control interface must usually be replaced as well.

Quick disconnect proximity switches must be used with a quick disconnect plug. The plug has a socket with a threaded sleeve to hold the proximity switch, as well as five meters of cable. This allows a damaged or worn out proximity switch to be replaced without rewiring it. Simply unscrew the threaded sleeve, unplug the old switch and replace it with a new one.

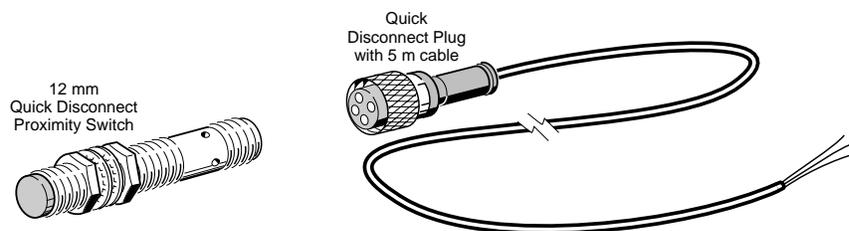


Fig. 32

There are six major types of proximity switch brackets. All models except the SH 2/UV bracket mount to the conveyor rail with socket head cap screws and T-nuts. The SH 2/UV attaches directly to a stop gate with self-tapping screws.

The barrel of the proximity switch is typically clamped in place between the switch bracket halves. The halves are then fastened together with the included screws. When putting the switch in the bracket, tighten the screws holding the two halves together enough to hold the switch loosely. Once the switch is positioned so that it reads properly without interfering with pallet movement, the screws should be tightened securely to clamp the switch in place.

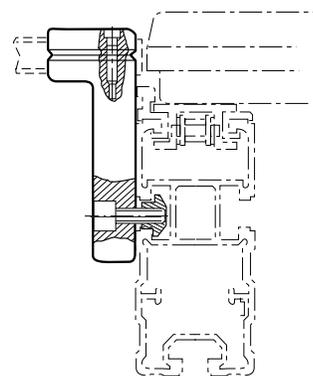


Fig. 33

Putting it all together:

Controlling Pallet Accumulation

An accumulation control kit is an easy means of preventing excessive pallet accumulation, which can overload a stop gate or module. The kit uses a rocker and a standard stop gate, connected pneumatically, to prevent excessive accumulation at a specific point in the line. The diagram below shows a typical installation.

How to install the accumulation control kit:

1. Determine the maximum number of pallets that can accumulate before overloading a stop gate. To determine this, divide the stop gate capacity (standard stop = 75 kg at 12 m/min) by the total weight of the loaded pallet, rounding the result down
2. Install the rocker such that the last allowable pallet will activate it (in this example, the sixth pallet).
3. The stop gate should be installed such that the stopped pallet does not contact the rocker. This location will depend on whether the stop gate should catch the pallet on the trailing edge or the leading edge.
4. Install the pneumatic switching valve on the rocker, then connect the pneumatic lead to the stop gate, following the pneumatic diagram below. The stop gate should remain open (down) when no pallet is present at the rocker, and close (up) when the rocker is triggered.

For example: a 240 x 240 mm pallet with a steel support plate weighs 2.0 kg. With a 9 kg load on each pallet, the total number of pallets that can accumulate at a standard stop gate is:

$$\frac{75 \text{ kg}}{(2 \text{ kg} + 9 \text{ kg})} = 6.8 = 6 \text{ pallets}$$

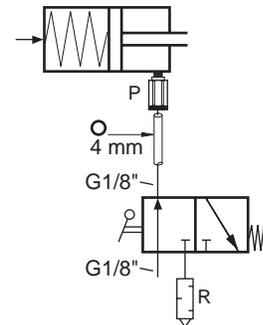


Fig. 34

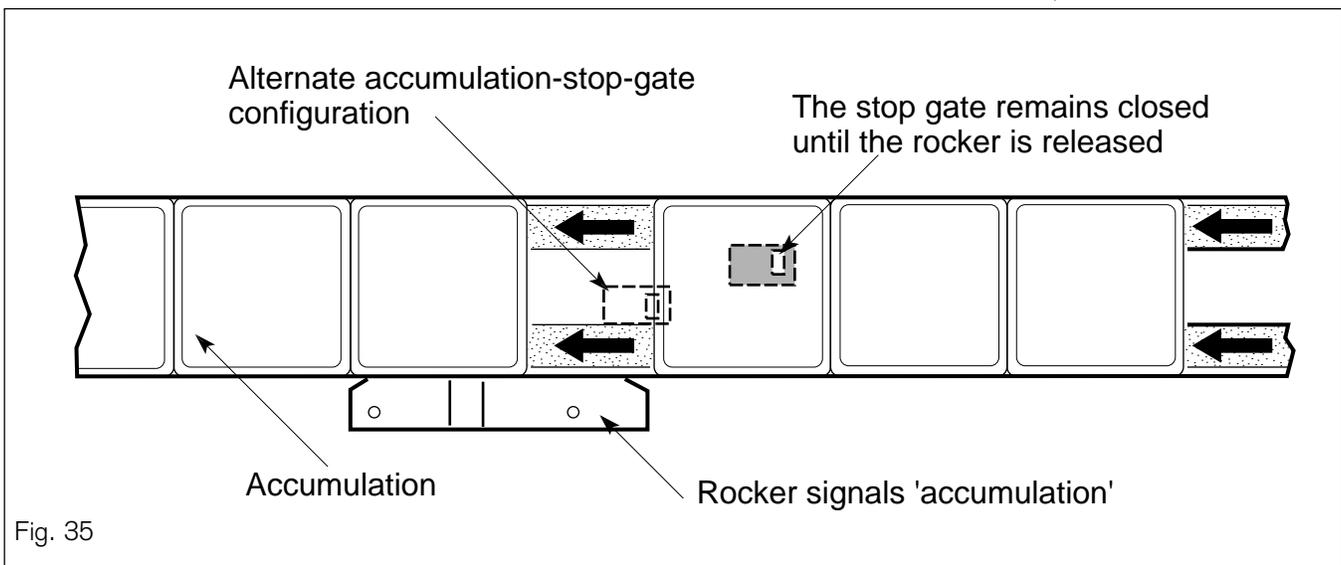


Fig. 35

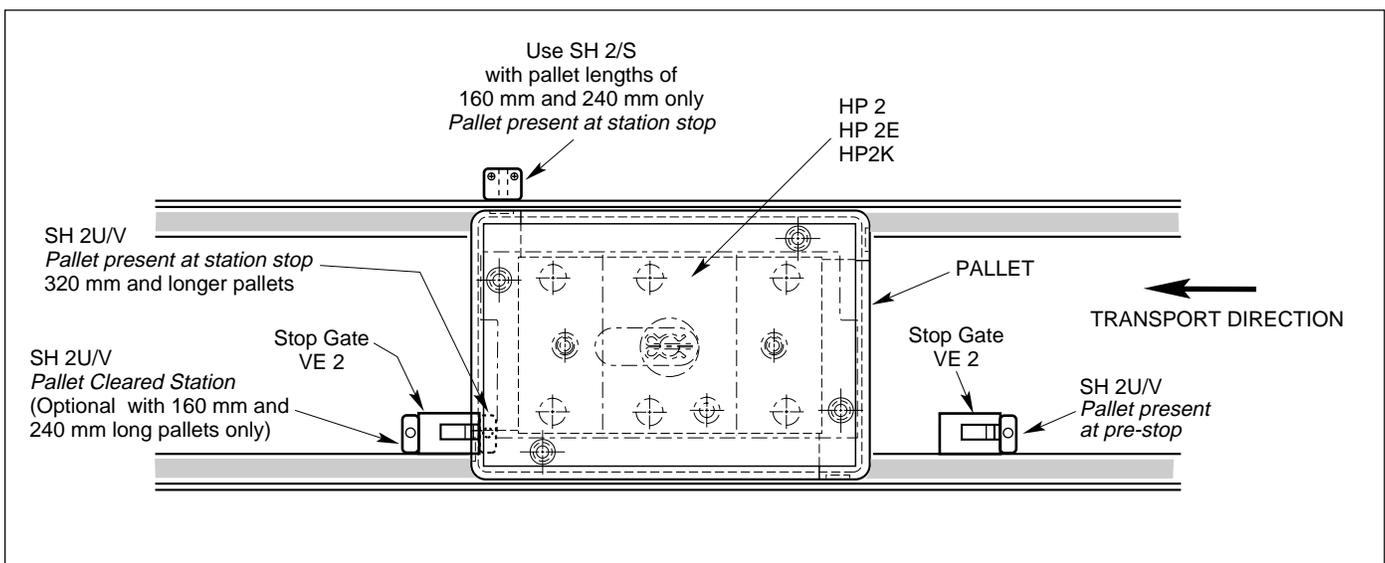
Traffic Control for Lift-Position Units

A traffic control kit separates pallets as they enter and exit a lift-position unit, and prevents pallet overflow at the station. The kit includes two stop gates, three proximity switch brackets, and proximity switches can be ordered as an option.

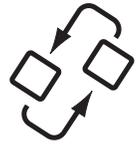
NOTE: The user is responsible for any controls systems and programming necessary for use of the proximity switches.

How to install the traffic control kit:

- Two standard VE 2 stop gates are used. A "pre-stop" stop gate is mounted before the lift-position unit, to separate oncoming pallets. A second stop gate ("station stop") is mounted after the lift-position unit, to stop the pallet in the proper position above the lift plate. They should be installed as shown below, in a leading edge stop position.
- An SH 2U/V proximity switch bracket should be installed on the pre-stop as shown below to detect whether a pallet is present at the stop.
- A second proximity switch must be mounted to recognize the pallet's presence at the station stop. The location of this second switch and the bracket used depends on the pallet length (in the direction of movement). For pallet lengths of 160 and 240 mm, use an SH 2/S proximity switch bracket mounted as shown below. For larger pallets, an SH 2U/V bracket should be mounted on the station side of the station stop, as shown.
- A third proximity switch is mounted on the back side of the station stop with a SH 2U/V bracket to detect that the pallet has cleared the station. This is necessary for all pallet lengths greater than 240 mm, and is optional for pallet lengths of 160 and 240 mm.
- Make sure there is sufficient clearance between the pre-stop and the lift-position unit to prevent pallet contact when the lift-position unit raises or lowers. Adjust the station stop and proximity switch as needed to make sure that the pallet is properly aligned on the positioning pins of the lift-position units.

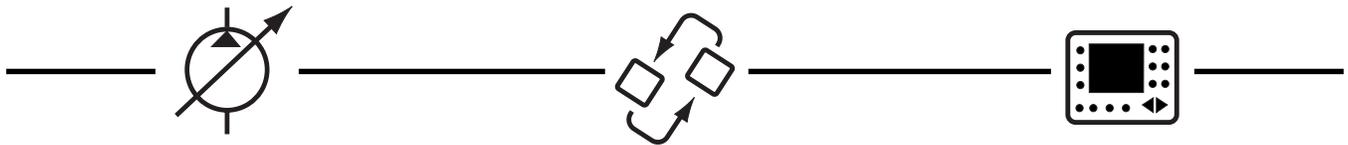


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