



for a greener tomorrow



GUIDED OPERATOR SOLUTIONS

Eliminate mistakes in manual picking processes



- Improve product quality
- Increase operator efficiency and speed
- Enhance overall operational effectiveness

A lean strategy in human mistake prevention

At parts assembly production sites, where parts are picked from stock, it is almost inevitable that picking mistakes will occur. As parts become more complex and their component types increase, the problem of picking mistakes grows. With Mitsubishi Electric's Guided Operator Solutions, such mistakes can be easily eliminated, helping to reduce waste, improve quality and boost productivity.



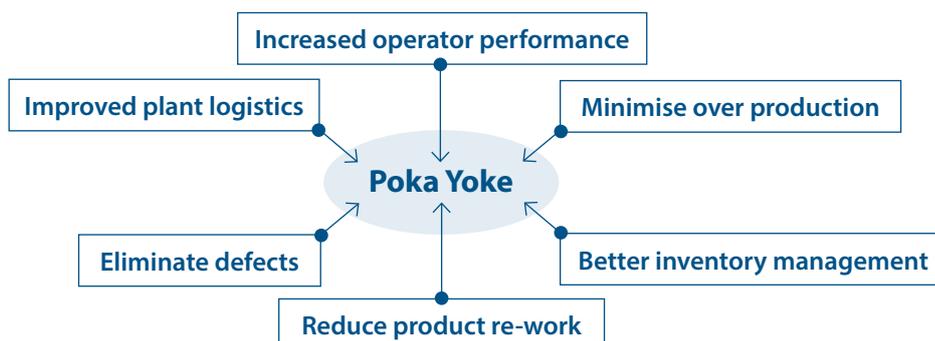
Lights or doors guide the operator to the correct box

Poka Yoke = mistake prevention

Statistically, it has been found that human error when picking parts is one of the most significant causes of mistakes in assembly operations. Typical problems include picking the wrong parts with a similar shape or name, picking and assembling parts out of sequence, or simply missing a part from a sequence.

While product inspection can prevent faulty goods being shipped to customers, it does little to prevent those defects from being introduced into the product in the first place. While for some companies a certain level of waste or rework will be accepted, for others there will be the desire to eliminate mistakes earlier in the production process before real value has been added to the product.

To solve these issues Mitsubishi Electric have developed their integrated Guided Operator Solutions, based on the principles of Poka Yoke, a Japanese term that translates generally as 'mistake prevention'. Poka Yoke is a method of eliminating mistakes in a manufacturing or logistics operation at source before they can occur.

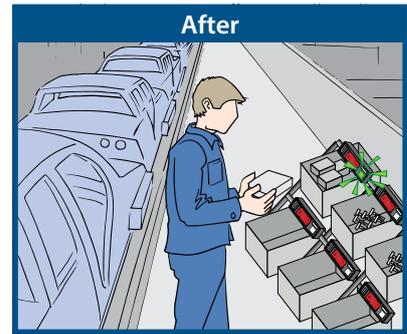


Tangible benefits

The costly impact of quality issues is largely recognised for manufacturing companies that engage in assembly tasks. Mitsubishi Electric's Guided Operator Solutions not only significantly reduce the risk of these quality issues occurring but they also can be deployed in a diverse range of industry sectors where the benefits can be identified by both managers and operators.



Automotive Assembly



Time to read part list and instructions

Operator must search for parts

Slow assembly time

Potential for incorrect parts assembly

Extensive operator training required

No parts list or instructions

No need to search for parts

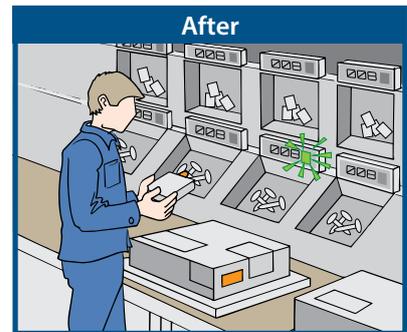
Faster assembly time

Increased assembly quality

Reduced operator training requirements



Electronics Assembly



In a typical application, where personnel are required to pick a number of different parts or products from bins in sequence, the chances of the worker correctly picking the parts with 100% reliability every time are small. At the very least, a significant proportion of the production time will be taken up by looking for the right part and ensuring that it is indeed

the correct part number. In the worst case, a mistake introduced into the product will go unnoticed until further up the production line - if at all.

However, with the Mitsubishi Electric Guided Operator Solutions in place, the automation system guides the worker to the correct parts bin, perhaps by

simply lighting an indicator next to the correct picking location, or by opening a shutter and requiring an operator acknowledgement of the successful pick of the correct part. Picking becomes not only inherently more reliable and mistake-free but also much faster, so both quality and overall productivity improve.

A totally integrated solution

Simple

The design of the Guided Operator Solutions has been based on simplistic concepts. Terminals are easily installed on pipe racking and connected via a dedicated cable that avoids the need to run multiple cables back to the main controller, significantly saving on wiring costs.

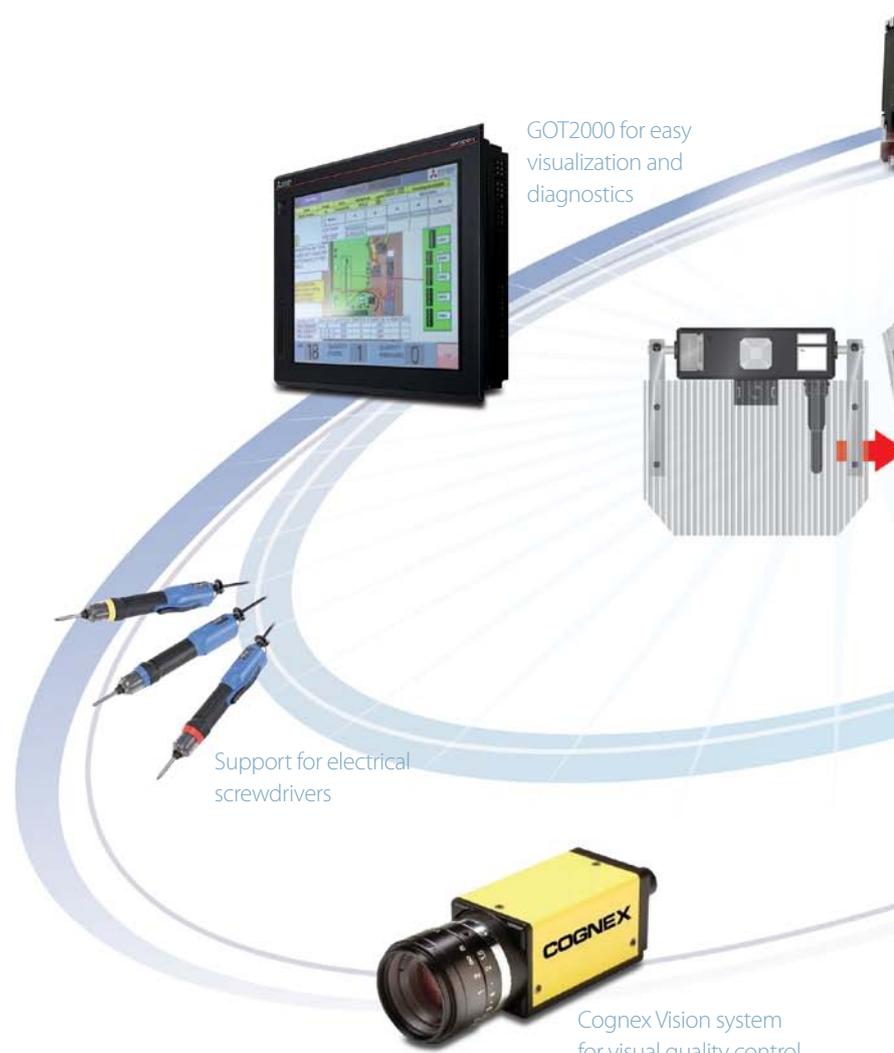
Intuitive connectors also enable fast installation of networks without the need to cut or strip the wires. Terminals are quickly setup with an address writer and using a dedicated software they can be directly mapped to the controller. This allows the applications to be easily configured, programmed and maintained.



Versatile

The sheer variety of the terminals available makes Mitsubishi Electric's solution suitable for almost any application. For example, photoelectric sensors provide options for applications where high picking speed is a necessity. Alternatively for more cost sensitive applications an array of push button and lever type feedback actuators can be provided.

Terminals with opening/closing doors provide a physical barrier to selecting the wrong part, a highly effective method to eliminate mistakes. Additionally some devices are fitted with a display to identify how many pieces should be picked from any bin, again increasing operator effectiveness.



GOT2000 for easy visualization and diagnostics

Support for electrical screwdrivers

Cognex Vision system for visual quality control



Integrated

Often assembly tasks must fit into the wider operational environment of the plant. This is essential to avoid the issues of over and under production. It is also important to consider the resource planning for parts used in the picking operations.

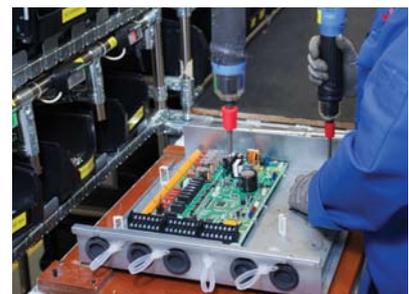
To permit connectivity to multiple picking applications within the plant dedicated bridges connect stations over CC-Link and CC-Link IE networks. High speed data communication enables synchronisation of tasks, but also allows assembly cells to be distributed according to the needs of the production site. Furthermore, direct integration of MES technology permits the Guided Operator Solutions to be connected to high level organisational systems so that output and resource planning are controlled in real time.



Expandable

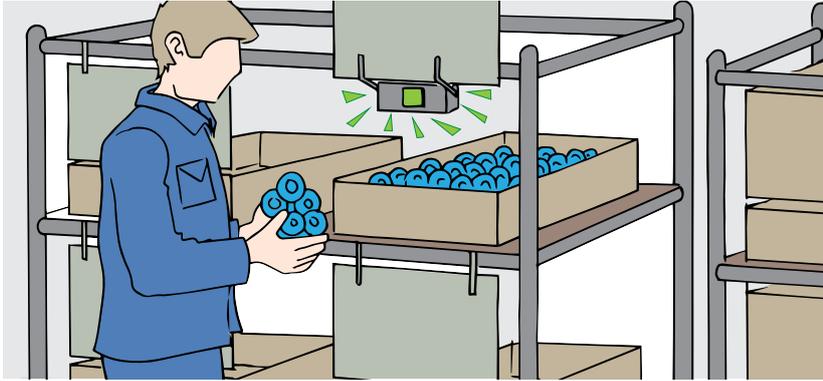
At the heart of the Guided Operator Solutions are Mitsubishi Electric controllers with dedicated masters communicating with the network of terminals. Depending on the complexity of the application, simple control can be provided using FX series PLCs or for more advanced applications the L series or Q series PLCs can be configured.

Through connecting other devices to the controller such as bar code scanners, electric screwdrivers or vision systems, Guided Operator Solutions can be tuned to the exact needs of the operator. Further enhancements can be achieved through the selection of Mitsubishi Electric's intuitive GOT HMIs to display work instructions or alternatively drive and robotic technology can be integrated into the manufacturing cell.



Typical applications

Guided Operator Solutions, sometimes known as pick to light solutions, were originally deployed in the automotive sector. However, with Mitsubishi Electric's wide array of ergonomically designed terminals it is possible to deploy these solutions in many other industry areas that include; logistics, semiconductor and life science sectors.



Picking

Picking is a key area where production efficiency can be improved and where product quality can be enhanced. Guided Operator Solutions significantly reduce overall man-hours, eliminate mistakes in parts picking, and also reduce operator fatigue.



Parts replenishment

Parts replenishment is another area where mistakes can occur, and these can have knock-on effects in quality control in assembly. Guided Operator Solutions identify exactly where parts need to be replenished and ensure that correct parts are added to the bin.



Production cell

The 'cell production' model for assembly is becoming common at plants focused on 'high mix, low volume' production, with a single operator responsible for the complete assembly of a product. Guided Operator Solutions can eliminate mistakes at source reducing the risk of re-work on the product.

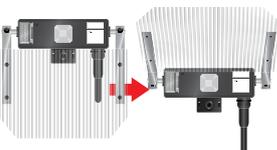
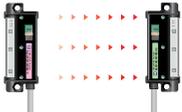
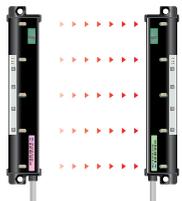


Kitting

Kitting out a tray with components for a subsequent manufacturing process requires an operator to pick a number of parts from a number of different bins, following detailed work instructions for components and quantities. Guided Operator Solutions ensure the right components are added to the kit box in the right quantities, saving time and reducing mistakes.

Terminal options

Guided Operator Solutions offer a variety of terminal types, they range from a simple LED and push button device through to door operated terminals. Options for lever switch and photoelectric terminals are also available.

IMAGE	MATERIAL NAME	DESCRIPTION	ARTICLE NUMBER
	BL227XB-K02VN-P	Compact, pushbutton switch, single colour indication	295195
	BL227XB-K06MN-P	Compact, pushbutton switch, multi colour indication	295196
	BL227XB-K71VN-P	Standard compact, pushbutton switch, single colour indication, 7 segment display	295197
	BL227XB-K02V-P	Standard compact, lever switch, single colour indication	295198
	BL227XB-K06M-P	Standard compact, lever switch, multi colour indication	295199
	BL227XB-K71V-P	Standard compact, lever switch, single colour indication, 7 segment display	295200
	BL227XB-K02VL-P	Standard compact, photoelectric downward reflection, single colour indication	295201
	BL227XB-F04V-P	Standard, door, lever switch, single colour indication	290111
	BL227PB-T07P02V-P	Photoelectric transmission (emission), single colour indication, 70 mm	295202
	BL227XB-T07P02V-C	Photoelectric transmission (reception), single colour indication, 70 mm	295203
	BL227PB-T14P02V-P	Photoelectric transmission (emission), single colour indication, 140 mm	295204
	BL227XB-T14P02V-C	Photoelectric transmission (reception), single colour indication, 140 mm	295205

Note: Accessories next page

Accessories

MATERIAL NAME	DESCRIPTION	ARTICLE NUMBER
ARW-04-RH	Address writer (ARW-04 +Infrared ray remote head)	295478
FK4-125-100	4-core flat cable (1.25 sq), 100m winding	290883
LP4-WR-10P	LP connector For 4-core flat cable (1.25 sq), 10 connectors included.	290884
BT0	Terminator (for ASLINK series)	290896
LP-TOOL	Crimping tool for LP connector	289161
ANF-01	ASLINK Filter	295479

Masters and gateways

MATERIAL NAME	DESCRIPTION	ARTICLE NUMBER
RJ51AW12AL	MELSEC iQ-R AnyWireASLINK master module	301856
QJ51AW12AL	MELSEC Q series AnyWireASLINK master module	290141
LJ51AW12AL	MELSEC L series AnyWireASLINK master module	290898
FX3U-128ASL-M	MELSEC FX series AnyWireASLINK master module	290900
NZ2AW1C2AL	CC-Link AnyWireASLINK bridge module	294278
NZ2AW1GFAL	CC-Link IE AnyWireASLINK bridge module	297161



Scan the code to watch the movie and learn how Mitsubishi Electric employs Guided Operator Terminals in their own manufacturing operations to eliminate picking mistakes and guarantee product quality!

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