

A logical step  
into basic servo solutions

# SMARTSTEP

easy to use, highly dynamic



Advanced Industrial Automation

OMRON



Omron's SmartStep is a combined (motor and driver) servo system for point-to-point (PTP) positioning as part of a motion control process. SmartStep is designed to offer, in a simple way, all of the performances of a servomotor while ensuring fast, high-torque, high-precision positioning. Its excellent servo performance, minimum start-up effort and very attractive price make SmartStep the ideal solution for machine builders who need a basic, reliable servo drive system for fast, precise positioning of their machines.

## Cost-effective servo solution

### When reliability counts

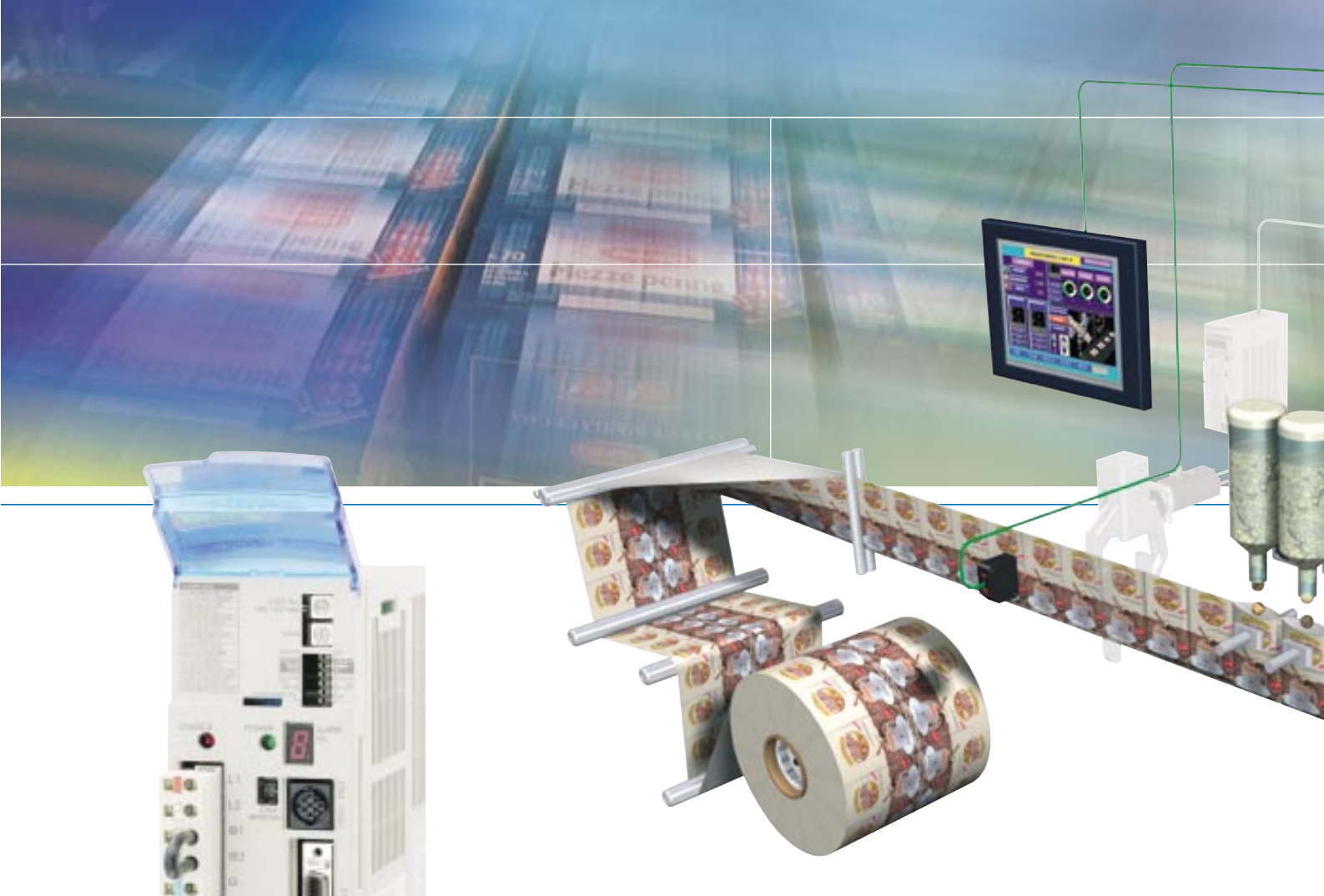
Research has shown that Omron's products are among the most reliable on the market, and SmartStep is no exception.

Based on years of experience in motors and related technologies, Omron's SmartStep is designed to deliver reliable, high-quality performance, around the clock.

### Full range for all applications

There are two kinds of motor types – cylinder and flat. There are six cylindrical motor types available, ranging from 30W to 750W outputs. The four flat motor models available range from 100W to 750W. All SmartStep models conform to CE, UL, cUL and other standards for international use.





### Easy to set up, easy to program

With SmartStep, easy-to-use dip-switches on the front panel enable you to program basic parameter settings, including auto-tuning, resolution setting, command pulse input setting, and dynamic brake setting. The smoothness and responsiveness of the motor is adjustable via the gain adjustment switch.

### Enhanced programming options

You can program the SmartStep with enhanced parameter settings using Omron's digital operator. This parameter unit can be connected easily to the servo drive via a cable. It can also be used to copy parameters from one drive to another, enabling you to have multiple drives in the same machine with parameters at precisely the same settings. In addition, Omron's Wmon software package can be used to program the servo drive, and store the parameters in a PC.

Digital operator parameter unit



### Easy to connect

SmartStep is easy to commission via the pre-assembled control cable, enabling SmartStep to be connected to an external intelligence source like a PLC. Omron provides a wide range of accessories for this called 'relay units'. Furthermore, SmartStep is easy to commission via the pre-assembled two-in-one cable that handles both motor power and encoder signal feedback.

### Auto-tuning online

SmartStep's auto-tuning function counteracts any vibration caused by load variations, by adjusting settings automatically and precisely to the machine movements.

### The smart solution

SmartStep is the logical progression from stepper motors to the servomotor world. With SmartStep, the machine motor does not lose position because the servo system has positional closed-loop feedback, it is designed to support big load ratio changes, and it is faster and more precise, thanks to the servomotor's use of high encoder resolutions.





## SmartStep in horizontal pouching machines

In this application the machine fills a pouch with food, medicine etc. There are two main movements to be controlled; pulling the film (plastic etc.) and filling the pouch.

### Pulling the film

A servomotor will pull the film a certain quantity, pre-set by the customer via the HMI. The servomotor will start and stop at regular intervals and these actions will be controlled by the PLC (via a digital output) or by the advanced Motion Control Unit (R88A-MCW151-E) together with the W Servo Family (please contact Omron for further information).

### Filling the pouch

The SmartStep servomotor and the Omron PLC are used to fill each pouch, and parameters like pulses, revolutions and weight are set by the customer via the HMI. The servomotor starts and stops at regular intervals and these actions are controlled by the PLC (via a digital output). The advantage of using the SmartStep is that the online auto-tuning function will adjust the required gains in the servo driver automatically for different kinds of difficult products, such as sugar. Variations in temperature and humidity can create differences between the set values and actual values. In this case the customer can change the set values via the HMI.

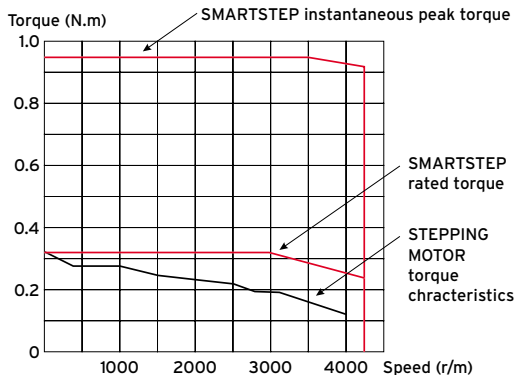
### The HMI is responsible for:

- The weight in each pouch
- The ratio between pulses and weight
- The speed of the servomotor
- The start/stop ratio of the servomotor.

### The right motor - every time!

Omron's sizing software package (motor selection software) calculates the ideal servomotor for your specific application, so you're never in doubt about which model to use for best results. With this software you will be able to design your machine, and the software will size your required SmartStep servomotor.

### Speed vs. torque comparison for a 100-W motor





## SmartStep specifications

**Power range 30W – 750W**

**100 VAC and 220 VAC power supply**

Single- and three-phase 200 VAC drives

**Two types of motor:**

Cylindrical types (for general applications)

Flat types (when space is a premium)

**3000 RPM (rated), peak 4500 RPM**

**300% peak torque**

**Pulse train input**

Controls in an easy way any point-to-point connection

**On-line auto-tuning**

The drive continuously adapts the gains according to load variation

**Easy to use:**

No adjustments are required for the basic set-up.

Set up the following by dip-switch:

Gain

On/Off online auto-tuning

Resolution setting: 500/1000/5000/10000 ppr

Dynamic brake

Just one cable from drive to motor

A wide range of control cables to connect to all kinds of

Omron controllers

**Easy monitoring**

Software tool (Wmon) to monitor and program the servo driver

**Easy selection**

Motor selection tool to size the servomotor for your application

**Optional parameter unit**

With copy function

**Compliant with international standards**

**Including CE, UL and cUL**

## SmartStep in labelling machines

In this application the machine sticks self-adhesive labels to objects (like boxes and bottles) that pass through the machine on a conveyor belt.

Sensor A reads the self-adhesive labels, and sensor B reads the objects on the conveyor belt.

**How it works:**

The inverter controls the speed of the conveyor belt, while the servomotor follows the speed of the belt. Once an object is present on the belt the servomotor starts up, and stops when the 'label' sensor detects that the labels are finished.

Via the HMI (Human Machine Interface) the customer can set the speed ratio between the inverter (in this case the Master) and the servomotor (slave) to speed up or slow down the labelling process. The customer can also control the position of the labels on the object by re-adjusting the timing/position to the A and B sensor signals.

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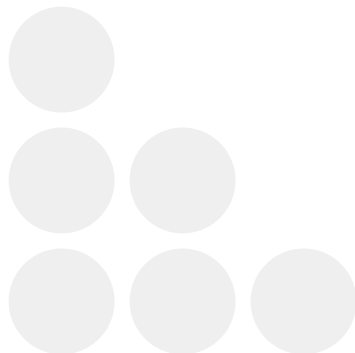
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**Automation and Drives**

- Programmable logic controllers • Networking
- Human-machine interfaces • Inverter drives • Motion control

**Industrial Components**

- Relays, electrical and mechanical • Timers • Counters
- Programmable relays • Low voltage switchgear • Power supplies
- Temperature & process controllers • Solid-state relays
- Panel indicators • Level controllers

**Sensing and Safety**

- Photoelectric sensors • Proximity sensors • Rotary encoders
- Vision systems • RFID systems • Safety switches
- Safety relays • Safety sensors

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