This manual is intended for the users of COIL WINDING FEEDER devices. You are kindly recommended to carefully read this manual before making the connections and use the system.

BTSR reserves the right to change at any time the contents of this manual, without notice.

For any technical or commercial problem, please contact your local BTSR dealer or call directly BTSR customer service centre. We will be glad to meet your needs.

Thank you for your trust and good job.

The product described herein is compliant with the requirements of the following Directives:

All BTSR products are covered by patents and adopt exclusive, profitable and high tech. Solutions.

BTSR® is a registered trademark “Best Technology Study & Research” of BTSR International S.p.A.
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Congratulations for choosing a BTSR product. With our copper wire COIL WINDING FEEDER devices, with or without the SMART MATRIX CWF control unit, you got an innovative, unique solution able to offer you multiple advantages concerning quality of your production.

**Controlled and constant tension wire feeding**

The BTSR COIL WINDING FEEDER control devices offer the possibility to control and adjust with extreme accuracy the copper wire feeding tension, for coil, transformer, motor, etc production machines.

The COIL WINDING FEEDER devices are in fact high precision measurement and control instruments providing a real time display of the exact wire tension and guaranteeing, through an accurate adjustment, a constant wire tension in every working condition. This occurs independently of the speed at which the machine is running (either high or low speed) and the tension is kept constant even when the feeding coil conditions progressively change because of the gradual emptying of the coil itself.

The COIL WINDING FEEDER devices are fully programmable and can easily be adapted to any kind of tension adjustment. Furthermore these devices are manufactured using very high quality and precision electronic components which guarantee an exact display of the wire tension as well as an accurate real-time control of the tension itself, all features which are unique to this device.
How to use this manual

This Operation Manual is divided into 4 Chapters.

Chapter 1 – Overview describes the main features, components and the operation principle of COIL WINDING FEEDER devices.

Chapter 2 – Technical Data and Installation gives the necessary instructions to install the COIL WINDING FEEDER devices.

Chapter 3 – Operation gives a detailed description of the necessary operations to setup and program the COIL WINDING FEEDER devices according to the application needs.

Chapter 4 – Troubleshooting and Maintenance provides a quick guide to solve the main failures of COIL WINDING FEEDER devices.

Symbols used

- Highlights notes, warnings and subjects which the attention of the reader should be directed to.
- This symbol indicates a particularly sensitive situation which could have an effect on the safety or proper operation of the system.
- All the items concerning the device programming menus, within this manual, are always show in CAPITAL LETTERS.
- Within this manual, the CWF 2000 xx devices will be indicated with the generic wording CWF.

Prescription for a Safe Use of the System

The parts of COIL WINDING FEEDER system which may cause an exposure to the hazards listed on Harmonized Standard EN14121-1:2007 Machinery Safety – Principle of Risk Assessment are the following:

- the PS20A switching power supply (if used) that supplies the 24 VDC voltage to the COIL WINDING FEEDER devices, because of the dangerous voltages (three-phase 380/480 VAC)
- the front part of the COIL WINDING FEEDER device (pulleys) because of the copper wire feeding motor rotation (the pulleys structure is shaped in such a way as to eliminate or reduce to negligible levels the entanglement or abrasion dangers for the operators)
Introduction

C E Conformity Declaration
(in accordance with the relevant European Directives)

Hereunder is reported a summary of the Conformity Statement, with which

BTSR SpA
Via Santa Rita
21057 OLGiate OLONA (VA) – ITALY
Telephone: (+39 0331 323 202)
Telefax: (+39 0331 323 282)

declares under its own responsibility that the following equipment:

Model: CWF 2000 XX
Type: copper wire feeding device
Intended Use: Copper wire tension feeding and control for coil, transformer, motor, etc production machines

complies with the prescriptions of the following Directives:

- 2006/42/EC concerning the Safety of Machinery.
- 2004/108/EC concerning the Electromagnetic Compatibility

and that for its design, manufacturing and verification the principles and concepts introduced by the applicable paragraphs of the following Harmonized Standards were adopted:

- UNI EN ISO 12100:2010
- EN ISO 13849-2:2012
- EN 61326-1:2012
- EN 60204-1:2006/AC:2010
- EN 60000-6-4:2007
- EN 61000-6-2:2005

The person authorized to collect the Technical File is:
Ing. M. Tomazzolli - info@btsr.com

The above indications are purely for information purposes and should not be considered as an alias of the actual conformity statement subscribed and released by the Manufacturer.
COMPLIANCE WITH EUROPEAN DIRECTIVES AND STANDARDS

The BTSR equipment manufactured by JOBS SpA after December 29, 2009 comply with the safety requirements provided by Machinery Directive 2006/42/CE and with the Electromagnetic Compatibility requirement provided by EMC Directive 2004/108/CE.

During the design and manufacturing stages of BTSR equipment, the relevant paragraphs of the following Harmonized Standards have also been used as reference and guide line.

Applicable Directives

<table>
<thead>
<tr>
<th>Directive</th>
<th>Date</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery Directive</td>
<td>2006/42/CE</td>
<td>dal 29/12/2009</td>
</tr>
</tbody>
</table>

Main Harmonized Standards Applied

<table>
<thead>
<tr>
<th>Standard</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety of machinery - General principles for design - Risk assessment</td>
<td>EN ISO 12100:2010 (1)</td>
</tr>
<tr>
<td>and risk reduction</td>
<td></td>
</tr>
<tr>
<td>Electromagnetic compatibility (EMC). Part 6-2: Generic standards</td>
<td>EN 61000-6-2:2005</td>
</tr>
<tr>
<td>Immunity for industrial environments.</td>
<td></td>
</tr>
<tr>
<td>Electromagnetic compatibility (EMC). Part 6-4: Generic standards</td>
<td>EN 61000-6-4:2007</td>
</tr>
<tr>
<td>Emission standard for industrial environments.</td>
<td></td>
</tr>
<tr>
<td>Electrical equipment for measurement, control and laboratory use -</td>
<td>EN 61326-1:2012</td>
</tr>
<tr>
<td>EMC requirements -- Part 1: General requirements</td>
<td></td>
</tr>
<tr>
<td>General requirements</td>
<td></td>
</tr>
<tr>
<td>General principles for design.</td>
<td></td>
</tr>
<tr>
<td>Validation.</td>
<td></td>
</tr>
</tbody>
</table>

(1) The EN ISO 12100:2010 Standard has replaced the EN ISO 12100-1, EN ISO 12100-2 and EN ISO 14121-1 Standards; however they will still be valid until 30/11/2013

Noise Levels

The CWF devices have been designed and manufactured to reduce the noise to minimum levels during operation. Weighted A acoustic pressure level generated by the machine and measured (following the criteria defined by the standards in force) at the operator working zones, during normal operation, is less than 70 db (A)

SAFETY AND RELIABILITY OF CONTROL SYSTEMS

Within the CWF device, the only safety control system (motor locking prior to carry out the threading operation) has been implemented according to the principles of the Harmonized Norm EN ISO 13849-1:2008/AC:2009. The following table shows the values of Category and of Performance Level (PL) implemented (with respect to the Required Performance Level (PLr) resulting from the risk assessment).

The PL calculation has been carried out by means of the “SISTEMA” (IFA) software.

<table>
<thead>
<tr>
<th>Safety function</th>
<th>Category</th>
<th>PL</th>
<th>PLr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor locking during the threading operation.</td>
<td>1</td>
<td>b</td>
<td>b</td>
</tr>
</tbody>
</table>

The PL value calculation and the relevant “SISTEMA” report are included within the Technical File of the CWF device.
System Components

The COIL WINDING FEEDER devices can be programmed and used either in individual and autonomous way, or they can be connected to a control/programming SMART MATRIX CWF terminal, thus obtaining a complete system providing further levels of analysis, adjustment, control and speed-up of production cycles, as well as statistical data processing, particularly useful to reach the quality and saving goals.

Main Characteristics of COIL WINDING FEEDER Devices

**Full Digital Technology**

The COIL WINDING FEEDER device is a digital instrument that allows setting of the exact tension value at which you want to operate. The data setting is done through a small three-button key-pad and a graphic LCD display.

In normal operating conditions this LCD provides a real time display of the exact wire tension (in grams) during the winding stage on the manufacturing process, the wire absorption speed (LWA) (in m/min) and, in graphical form, both the average and peak values of the tension applied to the wire.

The COIL WINDING FEEDER devices are controlled by two DSPs (Digital Signal Processor) and by ASIC components (BTSR patent) which provide great versatility (parameters may be programmed depending on the copper wire winding requirements)

The Full Digital Technology also allows performing a number of extremely accurate controls on the device motors (absorbed current, speed, torque, etc.).

**Temperature control**

In addition, the operator may display, at any time, the internal temperature (in °C) of both control board and motors, by pressing the Reset button.

An excessive increase of the temperature could infact indicate a wrong use of the device; for this reason, the software on board of device performs a continuous monitoring of the internal temperature.

If such temperature exceeds 100°C, an alarm message (ERROR °C) appears on the graphic area of LCD, and the Stop output is activated.

**Safety**

Thanks to a configurable safety code, all parameters can only be changed by authorized personnel who knows such safety code.

**Easy to install and manage**

The COIL WINDING FEEDER is a space saving device (325 x 251 x 70 mm). The device has been designed bearing in mind not only the technological aspects, but also the ergonomic ones. Thanks to these characteristics, the device can be easily fitted within the winding machine structure, without compromising the machine spaces which are usual to the operator.
Three different operating modes
Possibility of selecting three different operating modes:

- analog
- digital
- profiler

According to the selected mode, only the significant parameters will appear.

Pre-defined applications
Possibility of selecting and viewing directly from the navigation menu one of the 4 default applications (WIRES 1, WIRES 2, WIRES 3, WIRES 4) without the need to manually set the relevant parameters. The applications typically differ according to the wire type used.

The various applications determine a different system reactivity. For more information please refer to Section 3 Programming Level P4.

Programmable with variable tensions: 2 to 200 gr or 5 to 2000 g
The wide range of programmable tensions allows using the device both for small copper wire coil production addressed to the electronic field and for coil, winding, etc production addressed to the electro-technical field.

The tension value displayed on COIL WINDING FEEDER LCD display indicates the actual tension with which the device is working. This guarantees a constant and accurate monitoring of the operating conditions.

Automatic tension compensation
The COIL WINDING FEEDER device is fitted with a recovery arm, with strength adjustable by means of a spring mechanism driven by a stepper motor, that moves the spring fulcrum, modifying in this way the recovery arm strength.

Possibility of using up to four different tension values during the same production process
This function allows you to dynamically modify the copper wire control tension according to the operating stage, by means of the binary encoding of two input signals (00, 01, 10, 11). With each input signal encoding, a different tension value can be assigned during the programming stage.

External control
The COIL WINDING FEEDER device may be programmed also using the SMART MATRIX CWF terminal which, thanks to its flexibility, allows programming of many devices at a glance. Once you have chosen the desired working values on a sample machine, you will just transfer the selected setting data to the SMART MATRIX and then from SMART MATRIX CWF to other devices installed on different machines; all this in about 1 second (i.e. the time needed to complete the data transfer).
COIL WINDING FEEDER device components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Graphic display</td>
</tr>
<tr>
<td>2</td>
<td>Control/programming push-buttons</td>
</tr>
<tr>
<td>3</td>
<td>Wire feeding control motors</td>
</tr>
<tr>
<td>4</td>
<td>Tension sensor (load cell)</td>
</tr>
<tr>
<td>5</td>
<td>Recovery arm</td>
</tr>
<tr>
<td>6</td>
<td>Wire-guide bush</td>
</tr>
<tr>
<td>7</td>
<td>Electronic board</td>
</tr>
<tr>
<td>8</td>
<td>Gradual compression spring driving the recovery arm</td>
</tr>
<tr>
<td>9</td>
<td>Stepper motor</td>
</tr>
<tr>
<td>10</td>
<td>Recovery arm movable fulcrum</td>
</tr>
<tr>
<td>11</td>
<td>Wire-pressing roller</td>
</tr>
</tbody>
</table>
CWF device versions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CWF2000</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CWF2000SL</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CWF2000L</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>CWF2000H</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

(-) = 5 - 2000g
(SL) = CAPILLAR WIRE 2 - 200g
(L) = LOW TENSION WIRE 2 - 200g
(H) = HIGH TENSION WIRE 5 - 2000g
(2000) = TENSION RANGE 5 - 2000g

CWF

Coil Winding Feeder
Technical Features

<table>
<thead>
<tr>
<th><strong>COIL WINDING FEEDER Device</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage</td>
<td>24 VDC ± 10% - 24 VAC ± 20%</td>
</tr>
<tr>
<td>Maximum absorption</td>
<td>0.5A (during normal operation); 2A (under stress); 5A (at start-up)</td>
</tr>
<tr>
<td>STOP Output</td>
<td>0.3A 125 VAC.</td>
</tr>
<tr>
<td>Input</td>
<td>0-24 VDC</td>
</tr>
<tr>
<td></td>
<td>$V_{IL}$ Max 1.2 VDC</td>
</tr>
<tr>
<td></td>
<td>$V_{IH}$ Min 5 VDC</td>
</tr>
<tr>
<td>Programmable wire tension</td>
<td>2 ÷ 200 gr. (resolution 0.1 gr.) or 5 ÷ 2000 gr. (resolution 1 gr.) (*)</td>
</tr>
<tr>
<td>Integrated keypad</td>
<td>3 push-buttons + STOP red LEDs</td>
</tr>
<tr>
<td>Signaling</td>
<td>With LCD graphic display</td>
</tr>
<tr>
<td>Dimensions</td>
<td>325 x 251 x 70 mm</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>+10° / +60 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25° / +85° C</td>
</tr>
</tbody>
</table>

(*) The tension value depends on the device type. Please refer to the “COIL WINDING FEEDER device components” paragraph, Section 1
COIL WINDING FEEDER device electric interface

EXT connector

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>24Vdc OUT</td>
<td>24V VDC output</td>
</tr>
<tr>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>EXP Rx Tx +/-</td>
<td>Expansion serial line (currently not used)</td>
</tr>
<tr>
<td>EXC</td>
<td>Machine start/stop connection; it enables the</td>
</tr>
<tr>
<td></td>
<td>ERROR TENSION function (parameter P2.1)</td>
</tr>
<tr>
<td>ANL TENSION IN.</td>
<td>Analogue input 0-10V</td>
</tr>
<tr>
<td>TENS CODE 1</td>
<td>Binary input 1</td>
</tr>
<tr>
<td>TENS CODE 2</td>
<td>Binary input 2</td>
</tr>
</tbody>
</table>

POWER/1-2 connectors

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC2</td>
<td>24 VDC +/-10% or 24 VAC +/-20% power supply</td>
</tr>
<tr>
<td>AC1</td>
<td>24 VDC +/-10% or 24 VAC +/-20% power supply</td>
</tr>
<tr>
<td>COM (potential</td>
<td>Common</td>
</tr>
<tr>
<td>free contact)</td>
<td></td>
</tr>
<tr>
<td>GND</td>
<td>Ground (0V)</td>
</tr>
<tr>
<td>STOP1 (potential</td>
<td>COIL WINDING FEEDER alarm output.</td>
</tr>
<tr>
<td>free contact)</td>
<td></td>
</tr>
<tr>
<td>STOP2 (potential</td>
<td>Target output (only if connected to SMART</td>
</tr>
<tr>
<td>free contact)</td>
<td>MATRIX CWF).</td>
</tr>
<tr>
<td>CANL</td>
<td>BUS CAN</td>
</tr>
<tr>
<td>CANH</td>
<td>BUS CAN</td>
</tr>
<tr>
<td>RxTx + PC/</td>
<td>PC interface serial line</td>
</tr>
<tr>
<td>RxTx - PC</td>
<td></td>
</tr>
</tbody>
</table>

Both: Inputs and Outputs can be programmed as normally open (NO) or normally closed (NC) contacts. The programming is global, i.e. every input (and every output in the same way) operates as NO or NC, depending on the selected option. For more details, please refer to chapter 3 – Operation – P4.5 SIGNAL POLARITY.
Concerning all electrical systems, it is a suggested rule to ensure that the ground cable (GND) is connected to the device support.
Concerning all electrical systems, it is a suggested rule to ensure that the ground cable (GND) is connected to the device support.
Instructions for Correct Wire Threading

- Lead the copper wire on the inlet roller (1) and thread it inside the pressing roller (2).
- Wind the wire around the upper motor pulley (3) (clockwise direction).
- Wind the wire around the lower motor pulley (4) (counter-clockwise direction).
- Lead the wire through the wire-guide bush (5) and wind it around the recovery arm roller (6). Then pass it again into the wire-guide bush (5) and over the tension sensor load cell (7), to the outlet roller.
Page intentionally left blank
Operating Characteristics of COIL WINDING FEEDER Devices

For programming and control of COIL WINDING FEEDER devices, 3 push-buttons, with green/red built-in LEDs and a LCD display are available to the operator.

1. + Push Button (CONTROL)
Press this push-button to temporarily de-activate the device (lighting of the ENTER and RESET red leds, CONTROL led flashing during the recovery arm downward motion stage in order to allow the threading operation); when the CONTROL led stops flashing, press it again to re-activate the device. This button also allows de-activating (OFF) the power unit. During the programming stage, press it to increase the value of displayed parameter.

⚠️ Press this push-button whenever you need to operate on the device (i.e. for wire threading, etc.) to avoid undesired start-up of the motors.

During normal operation, the three buttons (ENTER, RESET and CONTROL) show the green LEDs on.
In case of alarm, the LEDs turn to red.

2. E Push Button (ENTER)
Press and hold down this push-button to gain access to the device programmable functions.
During the programming phase, press it to confirm the displayed parameter. Pressing and holding down this push-button for about 3 seconds on particular parameters, you will have the possibility to enable/disable the corresponding function.

3. Push Button (RESET)
Press this push-button to cancel possible error signaling on COIL WINDING FEEDER display (red LED flashing). During the Programming phase, press it to decrease the value of displayed parameter. During the Control phase, without an alarm condition in progress, this button allows you to display the motor temperature and current absorption.
4. LCD DISPLAY

It provides the real time display of measured and adjusted tension values, as well as the parameters programmable within the various menus, programming and error messages, device status, etc.

Symbols shown on LCD

A – Label Area

OK  It indicates the start easing function.
COM  Communication in progress with SMART MATRIX terminal or with the PC.
CONTROL  It indicates that the COIL WINDING FEEDER device is operating in Control status.
PROGRAM  It indicates that the COIL WINDING FEEDER device is in Parameters Programming status.
P1  Tension 1 activation.
P2  Tension 2 activation.
P3  Tension 3 activation.
P4  Tension 4 activation.
P5  Exclusion input(EXC) activation.

B – Message Area

It shows, in the selected language, the various programming menu items, as well as the error messages during the device operation, the wire feeding speed (LWFA nnnn), the device internal temperature, etc.

C – Value Visualization Area

It shows the wire tension value, during the normal operation, or the parameter being programmed.

D – Graphic Visualization Area

It shows, in graphical form (through a logarithmic scale) both average and peak tension values.
Functions Directly Available to the Machine Operator

The operator of a machine equipped with COIL WINDING FEEDER devices has the possibility to carry out some simple manual operations on the devices themselves, without having to request the aid of a supervisor or production manager:
1) Alarm reset
2) Current tension and application reading
3) Exclusion and re-inclusion of a COIL WINDING FEEDER device.
4) Real-time control of device temperature and current absorbed by the device motors.

1) Alarm Reset

When a COIL WINDING FEEDER device detects an Error condition (E2, Tension Error, etc.), the device stops and the LWA nnnn indication on display is replaced by the error message. To reset the alarm, once you have removed the cause that generated the error, press the button on the device.

For more details about alarm/error messages, please refer to chapter 4 “Troubleshooting”

2) Current Tension and Application Reading

At any time, pressing the button, you may check the set tension and the application currently configured on the device.

Press +:

The display will show the application currently configured on the device (WIRES 1, WIRES 2, WIRES 3, WIRES 4) and the currently set tension.

The , push buttons red LEDs turn to red, while the push buttons LED flashes.

When the push buttons LED stops flashing, press to return to LWA menu.
3) Exclusion and Re-inclusion of a COIL WINDING FEEDER Device

When needed, it is possible to temporarily exclude a COIL WINDING FEEDER device, in order to avoid undesired starts due to vibrations, etc. To exclude and re-include a device, operate as follows:

**Exclusion:**

Press and hold down for 3 seconds.

The display will show the exclusion confirmation request.

- to confirm the exclusion
- to cancel the operation

The <<OFF>> indication, shown on display, indicates that the device is currently excluded.

**Re-inclusion:**

To re-activate the device press and hold down for 3 seconds.

- to confirm the re-inclusion
- to cancel the operation

In order to temporarily de-activate an COIL WINDING FEEDER device, simply press . The condition of device temporarily de-activated is signaled by the lighting of the red LEDs on the three device buttons.

4) Control of Temperature and Current Absorbed by COIL WINDING FEEDER

At any time, pressing the button, you can check the internal temperature of the control board TB (38°C in the example below), of the motors (37°C and 36°C in the example below), as well as the current absorbed by the motors in Ampere (0.2 and 0.1 A in the example below), and the current IT (that corresponds to the sum of the 2 motor currents and the minimum current; 0.3 in the example below).
Programming the COIL WINDING FEEDER Devices

The COIL WINDING FEEDER device offers two programming environments:

1) **SIMPLE** *(it allows programming the main operation parameters, i.e.: MAIN TENSION 1…4, SPEED, SPRING FORCE and ANL ENDSCALE) (*)

2) **ADVANCED** *(it allows programming all the device parameters)*

To have access to the programming environment, press and hold down for 3 seconds the ENTER button, while the device is operating in Control environment.

If you keep the button pressed for less than 3 seconds, the device Firmware version will temporarily appear on the display.

To switch from **SIMPLE** to **ADVANCED** and viceversa, press and hold down for 3 seconds the ENTER button.

(*) For more details about the MAIN TENSION 1…4, SPEED, SPRING FORCE and ANL ENDSCALE parameters, please refer to the following paragraph “Advanced Programming of COIL WINDING FEEDER Devices”. The following page shows the general diagram of simple programming environment.

The parameters that can be set within the simple and advanced programming environment depend on the operating mode selection within the parameter P 4.4.
General Diagram of Simple Programming Environment
(The diagram refers to the PROFILER operating mode)

(A) \( LWA = \text{Length of Absorbed Wire in m/min} \)
Advanced Programming of COIL WINDING FEEDER Devices

With the **ADVANCED** programming environment, each COIL WINDING FEEDER can be programmed with specific control parameters which depend on the type of wire under processing, and on the type of application.

- **MAIN TENSION1÷4**
  - Values of the 4 possible control tensions

- **SPEED 1 – 2**
  - Speed above which the device operates with Tension 1, and under which it operates with Tension 2.

- **SPRING FORCE**
  - Strength of the spring adjusting the recovery arm

- **ERROR TENSION**
  - Tolerance beyond which an Error is generated

- **TIME ALARM**
  - Time for which the Tension may stay out of tolerance

- **RAMP UP**
  - Raising ramp in case of Tension increase

- **RAMP DOWN**
  - Lowering ramp in case of Tension decrease

In addition, you can program particular functions and/or service parameters that affect the device operating mode:

- **OFFSET**
  - Possibility of reading/setting the OFFSET value as well as enabling the device Auto Offset function.

- **TENS ADJ**
  - It allows you to adjust the device load cell

- **STEPPER HOMING**
  - It allows you to bring the recovery arm back to its correct initial position (*useful for the first installation*).

- **TAKE-UP POSITION**
  - It indicates, as a percentage, the position of the recovery arm (arm fulcrum position, variable by means of the stepper motor) and it allows calibrating the arm itself

- **SPRING ADJ**
  - It allows you to correct the device spring force (to synchronize the recovery arm operation on all devices)

- **ACCESS CODE**
  - Possibility of setting a protection password to prevent undesired access to the device programmable functions.

- **FEEDER CODE**
  - Possibility of visualizing and/or directly setting the device identification code.

- **LANGUAGE**
  - Possibility of choosing the language used to show the message on the device display.

- **BAUDRATE**
  - Data communication speed on serial line

- **APPLICATION**
  - Application selection according to the wire type used. The following pre-defined applications are available: WIRES 1, WIRES 2, WIRES 3, WIRES 4.

- **SIGNAL POLARITY**
  - Possibility of choosing the polarity of INPUT and STOP signals (either NO or NC).

- **ANL INPUT**
  - Possibility of carrying out the analog input offset

- **OPERATING MODE**
  - Device operating mode. The available default modes are: MODE PROFILER, MODE DIGITAL, MODE ANALOG.

Setting of these parameters is already done by BTSR during manufacturing (*default values*), however it can be easily changed by the winding machine operator, to meet specific requirements, using the **advanced programming** features.

COIL WINDING FEEDER devices offer 4 advanced programming levels: **P1**, **P2**, **P3** and **P4**, clearly indicated in the messages area of LCD during the programming sequences.
Within the **P1 level** the following parameters can be programmed, according to the operating mode selected within the parameter P 4.4:

<table>
<thead>
<tr>
<th>P4.4</th>
<th>MODE ANALOG</th>
<th>MODE DIGITAL</th>
<th>MODE PROFILER</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1.1</td>
<td>ANL ENDScale</td>
<td>MAIN TENSION 1</td>
<td>MAIN TENSION 1</td>
</tr>
<tr>
<td>P1.2</td>
<td>SPRING FORCE 1</td>
<td>MAIN TENSION 2</td>
<td>MAIN TENSION 2</td>
</tr>
<tr>
<td>P1.3</td>
<td>SPRING FORCE 1</td>
<td>MAIN TENSION 3</td>
<td>MAIN TENSION 3</td>
</tr>
<tr>
<td>P1.4</td>
<td>SPRING FORCE 1</td>
<td>MAIN TENSION 4</td>
<td>SPEED 1-2</td>
</tr>
<tr>
<td>P1.5</td>
<td>SPRING FORCE 2</td>
<td>SPRING FORCE 1</td>
<td>SPEED 2-3</td>
</tr>
<tr>
<td>P1.6</td>
<td>SPRING FORCE 2</td>
<td>SPRING FORCE 2</td>
<td>SPRING FORCE 2</td>
</tr>
<tr>
<td>P1.7</td>
<td>SPRING FORCE 3</td>
<td>SPRING FORCE 3</td>
<td>SPRING FORCE 3</td>
</tr>
</tbody>
</table>

Within the **P2 level** the following parameters can be programmed:
- TENSION ERROR
- TIME ALARM
- RAMP UP
- RAMP DOWN

Within the **P3 level** the following parameters can be programmed:
- OFFSET
- TENS ADJ
- MOTOR CALIBRA
- STEPPER HOMING
- TAKE-UP POSITION
- SPRING ADJ
- ANL INPUT
- ACCESS CODE
- FEEDER CODE

Within the **P4 level** the following parameter can be programmed:
- LANGUAGE SELECTION
- BAUDRATE
- APPLICATION
- OPERATION MODE SELECTION
- SIGNAL POLARITY

Press the (Control) button to switch from one programming level to the next one. Press (Reset) button to quit the programming environment.

The following page shows the general diagram of the advanced programming levels and default settings.
NOTES: The values shown refer to the default parameters (set by BTSR).

(A) \( LWA = \text{Length of Absorbed Wire in m/min} \)

(B) The selectable languages are Italian, English, French, Spanish, German, Japanese.
**P1 Programming Level (P4.4=MODE ANALOG)**

<table>
<thead>
<tr>
<th>LWA m/min</th>
<th>➔</th>
<th>SIMPLE</th>
<th>➔</th>
<th>ADVANCED</th>
<th>➔</th>
<th>MENU P1</th>
</tr>
</thead>
</table>

The P1 programming level, for the analog mode, allows you to setup 2 parameters:
1) Analog full-scale value (ANL ENDScale);
2) SPRING FORCE 1

With the COIL WINDING FEEDER in CONTROL status, (LWA nnnn displayed on LCD) press \( \text{E} \) and hold it down for 3 seconds, to switch to SIMPLE status. Hold it down again for 3 seconds until the ADVANCED wording appears; the COIL WINDING FEEDER device will switch to PROGRAM status.

\( \text{E} \) or \( \text{+} \) to continue.

\( \text{E} \) to start programming of parameters belonging to P1 menu.

**P1.1 ANL ENDScale**

This function allows you to set the tension value corresponding to the analogue input full-scale value [2-200gr or 5-2000gr].

\( \text{+} \) increases the full-scale value.

\( \text{-} \) decreases the full-scale value.

Example: by setting 1000, the analogue input full-scale value (10V), corresponds to a 1000g tension.

\( \text{E} \) to confirm and go to next parameter.

\( \text{-} \) to go back to CONTROL status.
The SPRING FORCE value indicates the strength that the spring opposes to the recovery arm motion. During the operation, the arm has to be on a lowered position, in such a way that the wire is always tensioned, when the machine stops and returns the wire back to the device. The spring strength has to be adjusted according to the working tension.

(Allowed values 5.0 ÷ 95.0%).

Choose the desired value using:

- (to increase the value) or (to decrease the value).
- E to confirm.

The following graph shows the SPRING FORCE trend according to the percentage set on the parameter. As you can see, the trend is not linear but rather exponential: with low percentages, a variation even significant of the parameter corresponds to a minimum variation of SPRING FORCE, while with high percentages, a minimum variation of the parameter corresponds to a high variation of SPRING FORCE.
The P1 programming level, for the digital mode, allows you to setup 8 parameters:
1) Device main tension 1 (MAIN TENSION 1);
2) Device main tension 2 (MAIN TENSION 2);
3) Device main tension 3 (MAIN TENSION 3);
4) Device main tension 4 (MAIN TENSION 4)
5) Spring force when the device operates with main tension 1 (SPRING FORCE 1)
6) Spring force when the device operates with main tension 2 (SPRING FORCE 2)
7) Spring force when the device operates with main tension 3 (SPRING FORCE 3)
8) Spring force when the device operates with main tension 4 (SPRING FORCE 4)

With the COIL WINDING FEEDER in CONTROL status, (LWA nnnn displayed on LCD) press and hold it down for 3 seconds, to switch to SIMPLE status. Hold it down again for 3 seconds until the ADVANCED wording appears; the COIL WINDING FEEDER device will switch to PROGRAM status.

or to continue.

 to start programming of parameters belonging to P1 menu.

MAIN TENSION 1
Tension value with which the COIL WINDING FEEDER device operates when the input signal TENS CODE 1 and TENS CODE 2 combination is: 00

[Allowed values 5 ÷ 2000 grams (or 2 ÷ 200 grams)].

Choose the desired value using:
(to increase the value) or (to decrease the value).

 to confirm.

MAIN TENSION 2
Tension value with which the COIL WINDING FEEDER device operates when the input signal TENS CODE 1 and TENS CODE 2 combination is: 01.

[Allowed values 5 ÷ 2000 grams, (or 2 ÷ 200 grams) or OFF].

Choose the desired value using:
(to increase the value) or (to decrease the value).

 to confirm.
Operation

P1.3 MAIN TENSION 3
Tension value with which the COIL WINDING FEEDER device operates when the input signal TENS CODE 1 and TENS CODE 2 combination is: 10.

[Allowed values 5 ÷ 2000 grams, (or 2 ÷ 200 grams) or OFF].
Choose the desired value using:
[+] (to increase the value) or [-] (to decrease the value).
[ ] to confirm.

P1.4 MAIN TENSION 4
Tension value with which the COIL WINDING FEEDER device operates when the input signal TENS CODE 1 and TENS CODE 2 combination is: 11.

[Allowed values 5 ÷ 2000 grams, (or 2 ÷ 200 grams) or OFF].
Choose the desired value using:
[+] (to increase the value) or [-] (to decrease the value).
[ ] to confirm.

Example of MAIN TENSION 1…4 parameters
For the processing of a copper wire coil, the following stages are necessary: the leading stage, the actual coil creation, the trailing stage. In this case, the terminal tension is different (typically much lower) from the coil winding tension. Three tensions have to be managed: MAIN TENSION 1 (on the leading terminal) MAIN TENSION 2 (on the actual coil), and MAIN TENSION 3 (on the trailing terminal).

The machine will operate at the MAIN TENSION 1, MAIN TENSION 2 or MAIN TENSION 3 according to the TENS CODE 1 and TENS CODE 2 binary signal combination.

<table>
<thead>
<tr>
<th>Binary signal</th>
<th>Used tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>MAIN TENSION 1</td>
</tr>
<tr>
<td>01</td>
<td>MAIN TENSION 2</td>
</tr>
<tr>
<td>10</td>
<td>MAIN TENSION 3</td>
</tr>
<tr>
<td>11</td>
<td>MAIN TENSION 4 (OFF)</td>
</tr>
</tbody>
</table>
The SPRING FORCE value indicates the strength that the spring opposes to the recovery arm motion. During the operation, the arm has to be on a lowered position, in such a way that the wire is always tensioned, when the machine stops and returns the wire back to the device. The spring strength has to be adjusted according to the working tension.

**P1.5  SPRING FORCE 1**
Spring force value when the device operates with main tension 1.
*Allowed values 5.0 ÷ 95.0%.*
Choose the desired value using:
- (to increase the value) or (to decrease the value).
- to confirm.

**P1.6  SPRING FORCE 2**
Spring force value when the device operates with main tension 2.
*Allowed values 5.0 ÷ 95.0%, or OFF.*
Choose the desired value using:
- (to increase the value) or (to decrease the value).
- to confirm.

**P1.7  SPRING FORCE 3**
Spring force value when the device operates with main tension 3.
*Allowed values 5.0 ÷ 95.0%, or OFF.*
Choose the desired value using:
- (to increase the value) or (to decrease the value).
- to confirm.

**P1.8  SPRING FORCE 4**
Spring force value when the device operates with main tension 4.
*Allowed values 5.0 ÷ 95.0%, or OFF.*
Choose the desired value using:
- (to increase the value) or (to decrease the value).
- to confirm.
P1 Programming Level (P4.4=MODE PROFILER)

The P1 programming level, for the Profiler mode, allows you to setup 8 parameters:
1) Device main tension 1 (MAIN TENSION 1);
2) Device main tension 2 (MAIN TENSION 2);
3) Device main tension 3 (MAIN TENSION 3);
4) Speed above which the device operates with main tension 1 (SPEED 1 – 2);
5) Speed above which the device operates with main tension 2 (SPEED 2 – 3);
6) Spring force when the device operates with main tension P1 (SPRING FORCE 1)
7) Spring force when the device operates with main tension P2 (SPRING FORCE 2)
8) Spring force when the device operates with main tension P3 (SPRING FORCE 3)

With the COIL WINDING FEEDER in CONTROL status, (LWA nnnn displayed on LCD) press  and hold it down for 3 seconds, to switch to SIMPLE status. Hold it down again for 3 seconds until the ADVANCED wording appears; the COIL WINDING FEEDER device will switch to PROGRAM status.

 or  to continue.

 to start programming of parameters belonging to P1 menu.

P1.1 MAIN TENSION 1
Tension value with which the COIL WINDING FEEDER device operates when the speed is higher than the value set on SPEED 1 – 2.
[Allowed values 5 ÷ 2000 grams (or 2 ÷ 200 grams)].
Choose the desired value using:
 (to increase the value) or  (to decrease the value).
 to confirm.

P1.2 MAIN TENSION 2
Tension value with which the COIL WINDING FEEDER device operates when the speed is lower than the value set on SPEED 1 – 2 and higher than the value set on SPEED 2 – 3
[Allowed values 5 ÷ 2000 grams, (or 2 ÷ 200 grams) or OFF].
Choose the desired value using:
 (to increase the value) or  (to decrease the value).
 to confirm.
P1.3 MAIN TENSION 3
Tension value with which the COIL WINDING FEEDER device operates when the speed is lower than the value set on SPEED 2 – 3.
[Allowed values 5 ÷ 2000 grams, (or 2 ÷ 200 grams) or OFF].
Choose the desired value using:

+ (to increase the value) or - (to decrease the value).
E to confirm.

P1.4 SPEED 1 - 2
The SPEED 1 – 2 value indicates the speed value above which the device switches from MAIN TENSION 2 to MAIN TENSION 1.
[Allowed values 0.0 ÷ 200.0 m/min, or OFF].
Choose the desired value using:

+ (to increase the value) or - (to decrease the value).
E to confirm.

P1.5 SPEED 2 - 3
The SPEED 2 – 3 value indicates the speed value above which the device switches from MAIN TENSION 3 to MAIN TENSION 2.
[Allowed values 0.0 ÷ 200.0 m/min, or OFF].
Choose the desired value using:

+ (to increase the value) or - (to decrease the value).
E to confirm.

The SPRING FORCE value indicates the strength that the spring opposes to the recovery arm motion. During the operation, the arm has to be on a lowered position, in such a way that the wire is always tensioned, when the machine stops and returns the wire back to the device. The spring strength has to be adjusted according to the working tension.

P1.6 SPRING FORCE 1
Spring force value when the device operates with main tension 1.
[Allowed values 5.0 ÷ 95.0%].
Choose the desired value using:

+ (to increase the value) or - (to decrease the value).
E to confirm.
**P1.7** **SPRING FORCE 2**

Spring force value when the device operates with main tension 2.  
*Allowed values 5.0 ÷ 95.0%, or OFF.*

Choose the desired value using:
- (to increase the value) or (to decrease the value).
- to confirm.

**P1.8** **SPRING FORCE 3**

Spring force value when the device operates with main tension 3.  
*Allowed values 5.0 ÷ 95.0%, or OFF.*

Choose the desired value using:
- (to increase the value) or (to decrease the value).
- to confirm.

**Example:**

On the following example the machining is composed of three different stages: on the initial stage (A) the machine operation speed is 8 m/min, then it increases up to 12 m/min (B) and then 500 m/min (C), to decrease again to 12 m/min (D), then 8 m/min (E) until it stops.

The SPEED 1 – 2 parameter has been set to a 20 m/min speed, the SPEED 2 – 3 parameter has been set to 10 m/min, while the MAIN TENSION 1, MAIN TENSION 2 and MAIN TENSION 3 have been set respectively to 500 gr, 50 gr and 25 gr.

When the 10 m/min speed is reached, the device automatically switches from 25 gr to 50 gr tension; when the 20 m/min speed is reached, the device automatically switches from 50 gr to 500 gr tension until the machine slows down to 20 m/min speed, when the device switches to 50 gr tension, and when the machine slows down to 10 m/min the device switches to 25 gr tension.
Interaction among the parameters: MAIN TENSION, SPEED N-N and SPRING FORCE

MAIN TENSION 1 = 500 gr
MAIN TENSION 2 = 50 gr
MAIN TENSION 3 = 25 gr
SPEED 1-2 = 20 m/min
SPEED 2-3 = 10 m/min
**P2 Programming Level**

The P2 programming level allows you to setup 4 parameters:

1) Tolerance with respect to the main tension (ERROR TENSION)
2) Max deviation time from tolerance band (TIME ALARM)
3) Control of change-over speed from a given working tension to a higher tension (RAMP UP);
4) Control of change-over speed from a given working tension to a lower tension (RAMP DOWN)

**ERROR TENSION**

Tolerance band beyond which the machine will be stopped. The error indication and machine stop occur only if such tolerance is exceeded for the time period set in the next parameter (TIME ALARM).

[Allowed values ± 0°÷ 100%].

(*) Setting 0.0 activates the AUTO mode; this means that the system will automatically calculate the error threshold as 50% of MAIN TENSION. This means that when changing the MAIN TENSION. (P1.1) value, the ERROR TENSION value changes accordingly, without the need of changing it manually.

Choose the desired value using:

(+) to increase the value or (-) to decrease the value.

(to confirm).

**Example 1:**

- Main Tension: 50 g
- Error Tension: ± 20%

---

**Diagram:**

- Theoretical Main Tension
- Tolerance Band
Example 2: Main Tension: 400 g
Error Tension: ± 15%

Example 3: Main Tension: 400 g
Error Tension: ± 70%
**P2.2  TIME ALARM**

Time during which the tension value may exit from the tolerance band set by the previous parameter (ERROR TENSION). You can disable (OFF) this feature by holding the Enter button pressed for 3 seconds.

[Allowed values 0.1 (*) ÷ 25.0 seconds].

(*) Setting 0.0 activates the AUTO mode; this means that the system will automatically calculate the best alarm generation and machine stop time, depending on the feeding speed. At low speed, such time is 500 ms; as the speed increases it will be reduced up to a minimum of 50 ms; this allows a quick machine stop during normal operation avoiding, however, the risk of false stops when working at low speed.

Choose the desired value using:

- (to increase the value)
- (to decrease the value).

E to confirm.

Example: Main Tension: 50 g
Error Tension: ± 20%
Time Alarm: 2.0 sec.

The COIL WINDING FEEDER generates the “Error Tension” Alarm when the tension goes out of the programmed tolerance band and automatically resets the alarm as soon as the tension returns within the programmed tolerance band.

“Error Tension” Alarm active only when the COIL WINDING FEEDER device operates with P1 tension (MAIN TENSION)

**P2.3  RAMP UP**

This parameter allows you to control the time taken by the system to change from a given working tension to a higher tension, in such a way as to avoid undesired wire breakages.

[Allowed values 1 ÷ 200 ms/g]

[1 = minimum ramp time... 200 = maximum ramp time]. See the following examples where:

- N = value programmed with parameter P2.3 (Ramp Up)
- T1 = final tension value (high)
- T2 = initial tension value (low)
Example 1:
Final tension = 200 g
Initial tension = 100 g
N = 5 ms/g
\( t = (200-100) \times 5 = 500 \text{ ms} \)

Example 2:
Final tension = 200 g
Initial tension = 50 g
N = 20 ms/g
\( t = (200-50) \times 20 = 3000 \text{ ms} \)

Example 3:
Final tension = 300 g
Initial tension = 50 g
N = 50 ms/g
\( t = (300-50) \times 50 = 12500 \text{ ms} \)

**P2.4  RAMP DOWN**
This parameter allows you to control the time taken by the system to change from a given working tension to a lower tension, in such a way as to avoid excessive wire relaxations.

[Allowed values 1 ÷ 200 ms/g]

[1 = minimum ramp time... 200 = maximum ramp time]:

See the following examples where:

\( N = \) value programmed with parameter P2.4 (Ramp Down)
\( T1 = \) final tension value (low)
\( T2 = \) initial tension value (high)

Example 1:
Final tension = 100 g
Initial tension= 200 g
N = 5 ms/g
\( t = (200-100) \times 5 = 500 \text{ ms} \)

Example 2:
Final tension = 50 g
Initial tension= 200 g
N = 20 ms/g
\( t = (200-50) \times 20 = 3000 \text{ ms} \)
Example 3:
Final tension = 50 g
Initial tension = 300 g
N = 50 ms/g
\[ t = (300-50) \times 50 = 12500 \text{ ms} \]

Choose the desired value using:

- \[ + \] (to increase the value) or \[ - \] (to decrease the value).
- \[ \text{E} \] to confirm.
P3 Programming Level

The P3 programming level allows you to setup the following functionalities:
1) Offset reading/execution and Auto Offset enabling (OFFSET);
2) Device load cell adjustment (TENS ADJ)
3) Motor calibration (MOTOR CALIBRA)
4) Recovery arm positioning to the initial position (STEPPER HOMING)
5) Recovery arm positioning (TAKE-UP POSITION)
6) Spring force correction (SPRING ADJ)
7) Access code to programmable function; (KEY CODE)
8) Analogic input offset
9) COIL WINDING FEEDER identification code (FEEDER CODE).

+ to select the P3 level.

< to continue.

P3.1 OFFSET AUTO

This function is used to adjust the mechanical clamping position of COIL WINDING FEEDER device. It clears possible measurement errors due to the different clamping position of the device on the machine. The displayed indication is the actual OFFSET value resulting from the clamping position of the device.

While lifting the wire above the load cell, press + to check whether the stored OFFSET value corresponds to the actual OFFSET value. If the two values are different, press briefly – to align them.

Auto-Calibration of the Load Cell

Holding down < for 3 seconds you may activate the load cell Auto-Calibration function which brings back the Offset value to 100 grams (factory calibration value of COIL WINDING FEEDER devices).

During the auto-calibration process, an “OFFSET INT-CALI” message is temporarily shown on the display.

< to select the next parameter.
P3.2  TENS ADJ

This function allows you to accurately check the CWF device load cell calibration and to compensate possible small errors due, for instance, to friction differences among the devices.

[Allowed values 75.0 ÷ 125.0 %, or OFF] (100.0 corresponds to OFF)

To activate the adjustment keep the button pressed for 3 seconds. Under the TENS ADJ wording the set percentage value appears (on this example 110.0), while the segment display to the right shows the tension value detected by the load cell.

The adjustment can be carried out as follows:
1. apply a sample weight (e.g. 200 gr) to the device load cell
2. check the value shown on the segment display to the right
3. if the displayed value is different from the sample value, then press the or buttons to correct the adjustment percentage value until the segment display shows the sample weight value.

to select the next parameter.

P3.3  MOTOR CALIBRATION

Automatic function reserved to BTSR service staff, in case of motor(s) replacement.

It allows executing the automatic calibration of the new motor.

To activate the motor calibration procedure, press and hold down for 3 seconds.

The OFF indication will be replaced by 0000 and the first motor will automatically carry out a number of movements to both directions, in order to adjust the calibration, then it will stop and 0001 will appear to indicate that the device is now calibrating the second motor. At the end of the two calibrations the OFF wording will re-appear.

to select the next parameter.

P3.4  STEPPER HOMING

This parameter allows you to position the recovery arm to the correct initial position. We recommend to carry out this procedure at the first installation.

To activate the positioning procedure, hold down the button for 3 seconds. The procedure may last several minutes, during which the WAIT wording will be displayed.

At the procedure end the OK wording will appear.

to move to the next parameter.
P3.5  **TAKE-UP POSITION**

This parameter allows you to display the recovery arm current position and to activate, if necessary, the position calibration procedure.

To activate the calibration procedure, hold down the button for 3 seconds. The screen will show the indication corresponding to the relevant procedure stage (PH-1, PH-2 and PH-3).

At the procedure end the OK wording will appear.

E  to move to the next parameter.

P3.6  **SPRING ADJ**

This parameter allows you to calibrate the spring force inside the COIL WINDING FEEDER device. Infact, the springs inside the devices could not react in the same way even if stressed with the same strength, due to possible little mechanical characteristic differences. In other words, even if all the devices operate with the same SPRING FORCE value, the recovery arms of the devices themselves could be not aligned.

For this reason, when you use multiple COIL WINDING FEEDER devices, it will be possible to synchronize the recovery arm position, by correcting the spring force through this parameter.

[Allowed values 75.0 ÷ 125.0 %, or OFF] (100.0 corresponds to OFF)

To activate the adjustment keep the button pressed for 3 seconds. The display right side will show the spring correction percentage value (on this example 110.0%).

+  to increase the percentage value.

-  to decrease the percentage value.

For the COIL WINDING FEEDER device 2 types of gradual compression springs are available:
- spring with white reference: for operation with Tensions lower than 800 grams,
- spring with red reference: for operation with Tensions higher than 800 grams.

* The spring replacement procedure is described on chapter 4 “Troubleshooting and maintenance”

E  to move to the next parameter.
**Operation**

**P3.7 ANL INPUT**
This function allows you to execute the analog channel offset.

- [+] to check the value.
- [-] to update the value.
- [E] to move to the next parameter.

**P3.8 KEY CODE**
This function allows you to define a secret numeric code to prevent non authorized personnel from accessing the P1, P2, P3, P4 programmable functions.

This function may be either enabled or disabled by holding down the [E] button for 3 seconds. **OFF** indicates that the function is currently disabled.

If you enter an access code, this will be requested each time you attempt to activate the programming environment.

When the KEYCODE ??? request appears, type the secret key-code using [+ ] and [- ] buttons.

- [+] increases the value of secret key code.
- [- ] decreases the value of secret key code.

Press [E] to save the key-code and move to the next parameter.

**P3.9 FEEDER CODE**
This function allows you to visualize and/or set the numeric code corresponding to the identification address of the COIL WINDING FEEDER device.

Set the desired identification code using [+] (to increase the value) or [- ] (to decrease the value).

- [E] to return to the beginning of P3 menu.

**Note**
Usually the setting of device identification code is carried out from SMART MATRIX CWF terminal using the serial communication port, however in particular circumstances (for instance after the replacement of a COIL WINDING FEEDER device), it may be useful to set the code operating directly on the new device.

- [+] to switch to P4 menu.
- [- ] to return to CONTROL status without programming P4 menu.
P4 Programming Level

LWA m/min ➔ SIMPLE ➔ ADVANCED ➔ MENU P4

The P4 programming level allows you to select the various device operating options:
1) Language used to display menus and messages;
2) Baudrate
3) Application on which the device will be used;
4) Device operating mode
5) INPUT and STOP signal polarity (Normally Open or Normally Closed contact).

P4.1 LANGUAGE SELECTION
This function allows you to select the language used to display menu items, messages and errors.
[+] or [−] to scroll forward/backward the list of available languages:
ITALIANO – ENGLISH – FRANÇAIS – ESPAÑOL – DEUTSCH – JAPANESE
[✔] to confirm the language indicated on display and return to the beginning of P4 menu.

P4.2 BAUDRATE
This function allows you to choose the communication speed on serial line.
[+] or [−] to change the baudrate value. [Allowed values: 115200 or 57600]
[✔] to confirm and move to the next parameter.
P4.3 APPLICATION SELECTION
This function allows you to choose one of the pre-defined applications.
The behavior of COIL WINDING FEEDER device will depend on the chosen application.

or

to scroll forward/backward the list of available applications:

WIRES 1 – WIRES 2 – WIRES 3 – WIRES 4

to confirm the application shown on display and move to the next parameter.

Note: The applications determine the system reactivity. Usually it is difficult to establish which is the best application to use. As a general rule we recommend to set WIRES 3 and, if necessary, change the application until obtaining the desired quality.

P4.4 OPERATING MODE
This function allows you to choose one of the pre-defined operating modes.
The parameters that can be set within the programming level P1 change according to the operating mode selected.

or

to display the available mode list:

MODE ANALOG – MODE DIGITAL – MODE PROFILER

to confirm the mode indicated on the display and move to the next parameter.

P4.5 SIGNAL POLARITY
This function allows you to setup the polarity of INPUT and STOP signals.

+ to toggle the INPUT signal between NO or NC.

– to toggle the STOP signal between NO or NC.

E to confirm the options shown on display and move to the next parameter.
Page intentionally left blank
Indications Provided by the Red LEDs on COIL WINDING FEEDER Device

<table>
<thead>
<tr>
<th>Status of COIL WINDING FEEDER device</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification</td>
<td>GREEN/RED ALTERNATE FLASHING</td>
</tr>
<tr>
<td>ERROR E2</td>
<td>GREEN/RED ALTERNATE FLASHING</td>
</tr>
<tr>
<td>MOTOR LOCKED (with CONTROL button (+))</td>
<td>ON (LED flashing during the recovery arm motion)</td>
</tr>
<tr>
<td>ERROR TENSION</td>
<td>GREEN/RED ALTERNATE FLASHING</td>
</tr>
</tbody>
</table>

To interpret the failure condition and restore the normal operating conditions, please refer to the following table.
# Troubleshooting on COIL WINDING FEEDER Devices

<table>
<thead>
<tr>
<th>Faults</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The COIL WINDING FEEDER display is blank</td>
<td>System powered off</td>
<td>✴ Confirm that the device is correctly supplied.</td>
</tr>
</tbody>
</table>
| E2 displayed on COIL WINDING FEEDER display | 1) Motors locked | 1) Check if the 2 motors are correctly turning; Correctly thread the COIL WINDING FEEDER device as shown on page 2.4  
2) Temporary triggering of internal protections | 2) Turn the electrical supply of device OFF and then ON again  
☞ If you cannot locate the cause of failure, please contact your BTSR reseller (it could be necessary to send the device to the BTSR repair centre). |
| E3 displayed on COIL WINDING FEEDER display | 1) Presence of foreign bodies under the load cell.  
2) OFFSET value of COIL WINDING FEEDER device out of adjustment | 1) Clean the load cell using a slight air blow (max 1 bar)  
2) Perform a correct adjustment of the OFFSET value on COIL WINDING FEEDER device as described on page 3.23. |
| ES-1, ES-2 ES-CONT1, ES-CONT2 displayed on COIL WINDING FEEDER display | 1) Internal protection against motor 1 (ES-1 ES-CONT1) or motor 2 (ES-2 ES-CONT2) overcurrents | 1) Reset the alarm; if the problem persists, contact your BTSR reseller. |
| MT-BUS displayed on COIL WINDING FEEDER display | 1) Supply voltage lower than 15 Vdc | 1) Check the supply voltage, if the problem persists, contact your BTSR reseller. |
| CURR-1, CURR-2 displayed on COIL WINDING FEEDER display | 1) The current absorbed by motor 1 (CURR-1) or motor 2 (CURR-2) exceeded the maximum allowed value. | 1) Check the usage conditions of the systems.  
☞ If you cannot locate the cause of failure, please contact your BTSR reseller (it could be necessary to send the device to the BTSR repair centre). |
| TE displayed on COIL WINDING FEEDER display | 1) The temperature of control board exceeded the maximum expected value | 1) Check the usage conditions of the systems.  
☞ If you cannot locate the cause of failure, please contact your BTSR reseller (it could be necessary to send the device to the BTSR repair centre). |
<table>
<thead>
<tr>
<th>Faults</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMP MT1, TEMP MT2 displayed on COIL WINDING FEEDER display</td>
<td>1) The motor 1 (TEMP MT1) or the motor 2 (TEMP MT2) temperature exceeded the maximum expected value.</td>
<td>1) Check the usage conditions of the systems. If you cannot locate the cause of failure, please contact your BTSR reseller (it could be necessary to send the device to the BTSR repair centre).</td>
</tr>
<tr>
<td>The machine is not stopped by COIL WINDING FEEDER in case of wire breakage</td>
<td>1) The Stop function managed by the machine and associated with the COIL WINDING FEEDER device has not been correctly enabled within the machine program. 2) Wiring problem</td>
<td>1) Check the machine program handling the STOP input and confirm that it is enabled when the wire fed by COIL WINDING FEEDER is in working condition. 2) If the stop led on COIL WINDING FEEDER turn on, when the wire breaks, check the machine connecting cables. To check the correct operation of the COIL WINDING FEEDER STOP output press the “Control” button and confirm the lighting of red LEDs; if this does not occur please contact your BTSR reseller (it could be necessary to send the device to the BTSR repair centre).</td>
</tr>
<tr>
<td>The COIL WINDING FEEDER device does not communicate with SMART MATRIX terminal</td>
<td>1) The identification code of COIL WINDING FEEDER device is not correct 2) Failure on SMART MATRIX terminal 3) Wiring problem</td>
<td>1) Check that the parameter corresponding to the identification number (parameter P3.6) is correct; if necessary carry out the numbering procedure using the SMART MATRIX terminal or set directly the identification code on the device (parameter P3.6). 2) Check the correct operation of SMART MATRIX terminal using the numbering procedure described in the SMART MATRIX manual. 3) Check the wiring.</td>
</tr>
<tr>
<td>ASC1010 COM-ERROR displayed on COIL WINDING FEEDER display</td>
<td>1) Missing communication between main DSP and load cell DSP.</td>
<td>1) Reset the alarm; if the problem persists, contact your BTSR reseller.</td>
</tr>
<tr>
<td>ASC1010 EEP-ERROR displayed on COIL WINDING FEEDER display</td>
<td>1) Loss of calibration data</td>
<td>1) Reset the alarm; if the problem persists, contact your BTSR reseller.</td>
</tr>
<tr>
<td>WATCHDOG displayed on COIL WINDING FEEDER display</td>
<td>1) Device internal error</td>
<td>1) Reset the alarm; if the problem persists, contact your BTSR reseller.</td>
</tr>
</tbody>
</table>

*If the fault is not included in this table, please contact your local BTSR reseller, giving a detailed description of the kind of fault and the conditions in which it occurred. In the case where the BTSR Technical Service intervention would be required, before calling it is suggested to take note of the code printed on the faulty device, as this information will make diagnoses for the BTSR technicians easier. Example: Device code COIL WINDING FEEDER ..........................*
Ordinary Maintenance

The COIL WINDING FEEDER devices do not require special maintenance interventions, except a periodical cleaning, depending on the environment condition in which they operate.

⚠️ For cleaning purposes, do not use solvent, but rather a soft cloth dampened with neutral detergent or alcohol.

Recovery arm control spring replacement procedure

For the COIL WINDING FEEDER device 2 types of gradual compression springs are available:
- spring with white reference: for operation with Tensions lower than 800 grams,
- spring with red reference: for operation with Tensions higher than 800 grams.

To replace the spring, operate as follows:

Remove the protection door (A) on the device rear side.

The spring to be replaced (B) will be now visible.
The figure shows the bottom spring hooking pin.

The figure shows the top spring hooking pin.

Completely compress the spring as indicated on the figure.

Unhook the spring from the top pin and then from the bottom pin.
Catch the new spring as indicated on the figure.

Completely compress the spring.

Hook the spring to the bottom pin (A).

Hook the spring to the top pin (B).
COIL WINDING FEEDER - 4.7 -

Re-install the rear door.

Repairs

Any repair intervention on COIL WINDING FEEDER devices must be carried out by specialized personnel from BTSR. Any intervention attempt by non-authorized personnel, voids the warranty terms.