QUADRANT 2200 with CCT
QUADRANT 2200 RC with CCT

Technical Systems

Diagnosis

Contents

Central terminal
compartment

CCU

1.0 Control terminal service menu (up to module 1 no. 835024.2)

1.1 Service menu structure
(up to module 1 no. 835024.2)

This menu serves as a tool in fault-finding. It shows the status of various electrical components such as e.g. speed, voltage, pressure and switch positions.

To enter the service menu, press the keys "Scroll main menu", "Plus key" and "Minus key" at the same time.
The following mask appears:

Page "8/1 (Service 1)"

Current pressure [bar]	Current bale length [m]	

```
Service  1            8 / 1
P =   0 L 0 , 0 0     N 0 =    0
P 0          2 5 5    N 1 =    0
P 1             0     N 2 =    0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0   U : 1 1 , 6
F : 0 0 0 0 0 0 0 0       F F F F
```

- Control unit P+
- Control unit P-
- Inputs
- Outputs
- Error

- PTO shaft speed [rpm]
- Feed rake speed [rpm]
- Rotor speed [rpm]
- Voltage [V]
- Key test

Page "8/2 (Service RC)"
(press "Sub-menu" key one more time)

Cutting frame angle

```
Service   RC          8 / 2
W = + 2 0             N 0 =     0
                      N 1 =     0
                      N 2 =     0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0   U : 1 1 , 6
F : 0 0 0 0 0 0 0 0       F F F F
```
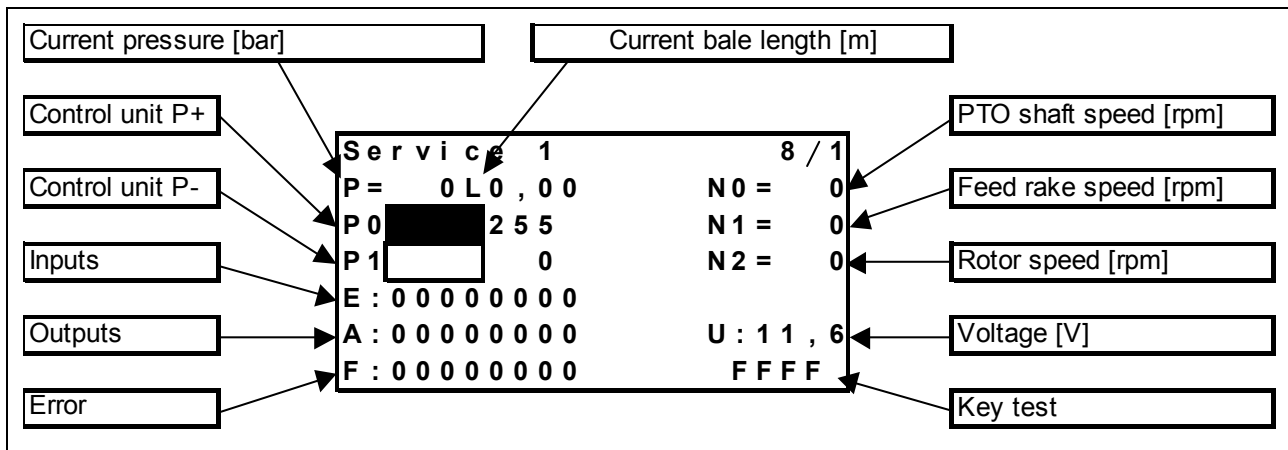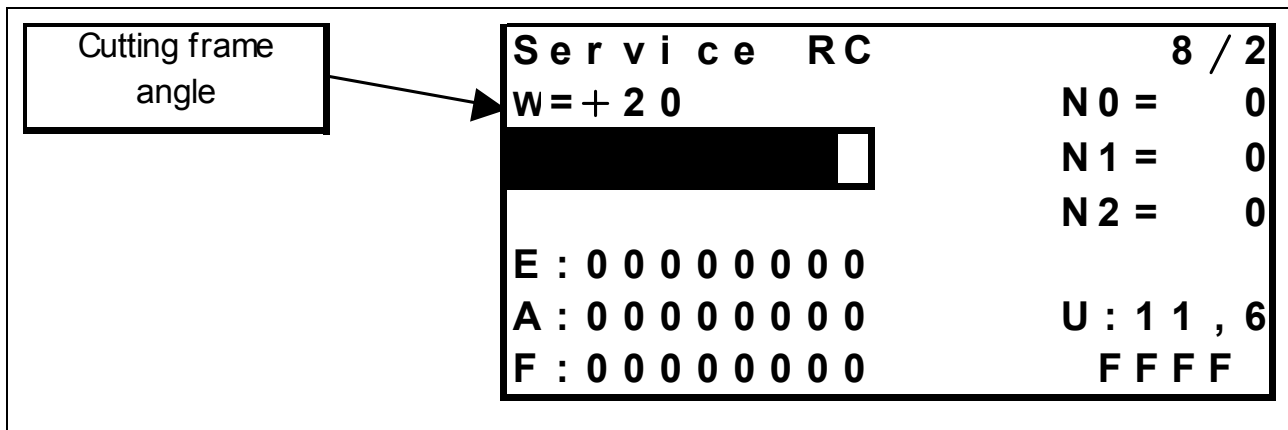
1.2 Additional information about page "8/1 (Service 1)" (up to module 1 no. 835024.2)

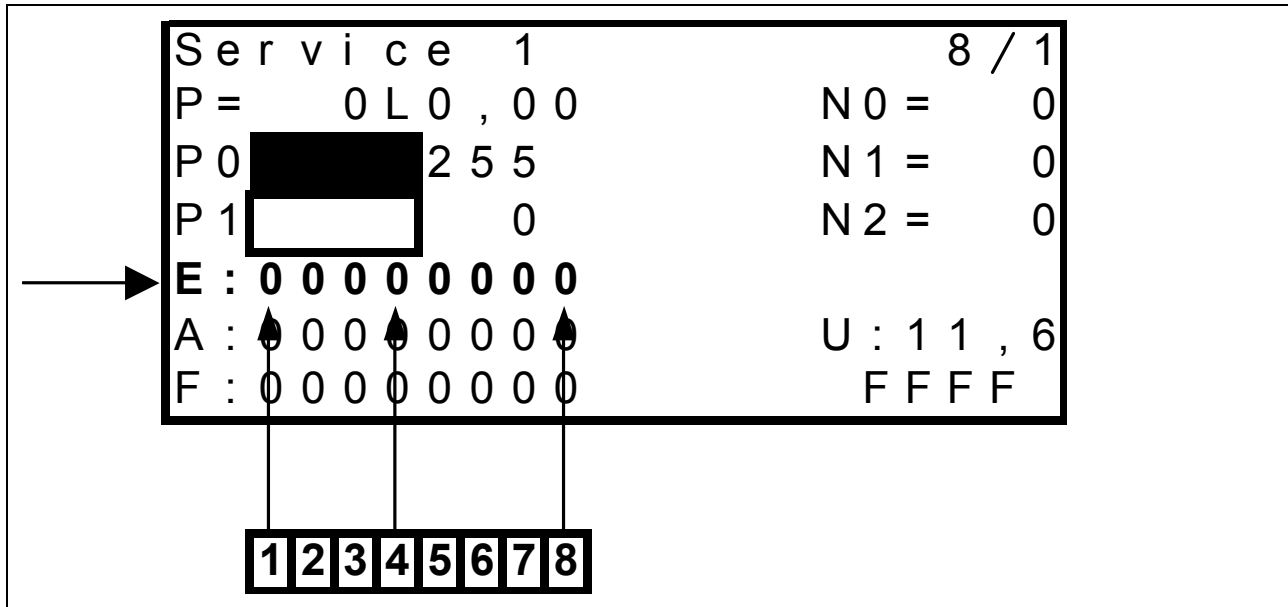| Menu item	Remark
(P=) Current pressure	The pressure in the baling chamber cylinders is displayed here in bars.
(L) Current bale length	The length of the bale in the baling chamber is displayed here in metres to the second decimal point.
(N0=) PTO shaft speed	The calculated PTO shaft speed in revolutions per minute is displayed here (this speed is measured by the drive speed sensor).
(N1=) Feed rake speed	The feed rake speed in revolutions per minute is displayed here (150 rpm at 1000 rpm PTO shaft speed)
(N2=) Rotor speed	The rotor speed in revolutions per minute is displayed here (140 rpm at 1000 rpm PTO shaft speed)
(U:) Voltage	The supply voltage is displayed here in Volt to the first decimal point.
Key test	A combination of characters and numbers is displayed here to test the function of the keys on the Control Terminal.
(P0) Control unit P+	The condition of the baling pressure build-up valve is displayed here. The displayed number is proportional with the valve actuation and may assume values from 0 to 255. 0 = Valve not actuated 255 = Valve fully actuated
(P1) Control unit P-	The condition of the baling pressure relief valve is displayed here. The displayed number is proportional with the valve actuation and may assume values from 0 to 255. 0 = Valve not actuated 255 = Valve fully actuated
(E:) Inputs	The condition of various circuits connected with the modules is displayed here. Each numeric character corresponds to one circuit. 0 = Circuit open 1 = Circuit closed
(A:) Outputs	The condition of various circuits connected with the modules is displayed here. Each numeric character corresponds to one circuit. 0 = Circuit open 1 = Circuit closed
(F:) Error	Malfunctions are displayed here. Each numeric character corresponds to one error. 0 = No error 1 = Error

1.3 Additional information about page "8/2 (Service RC)" (up to module 1 no. 835024.2)

(W=) Cutting frame angle	The cutting frame angle in degrees is displayed here. The higher the value, the wider the cutting frame is open.

1.4   Input testing (up to module 1 no. 835024.2)
Continuity test

```
Service  1                    8 / 1
P =     0 L 0 , 0 0         N 0 =       0
P 0 ████     2 5 5         N 1 =       0
P 1 █        0             N 2 =       0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0         U : 1 1 , 6
F : 0 0 0 0 0 0 0 0            F F F F
```

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Eight numeric characters are available for input diagnosis in line "E", each of them being assigned to one circuit.
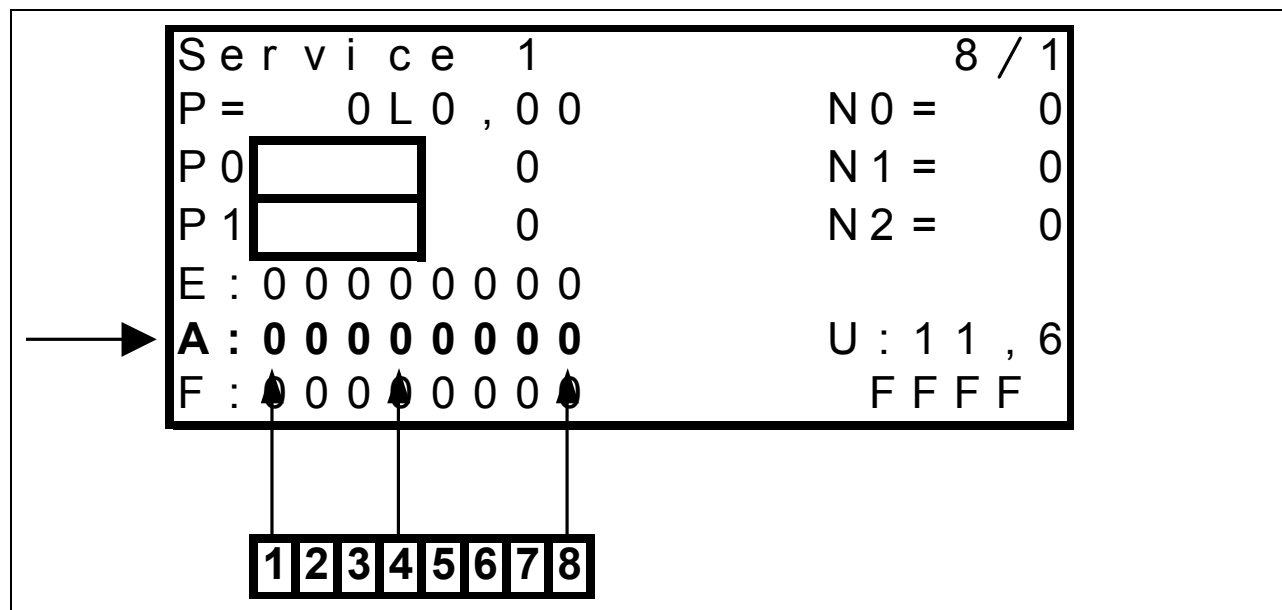
The numeric characters may assume the following values:

        0 = Circuit open or
        1 = Circuit closed.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

Numeric character	Designation		Display
E1	Z11	Twine break left/right actual value switch	0 = Operating status (normal) 1 = Twine break
E2	Z49	ROTOCUT knives ON actual value switch	0 = Switch not actuated 1 = Switch actuated
E3	U2	Retract bale ejector cylinder switch (red)	0 = Switch not pushed 1 = Switch pushed
E4	U1	Extend bale ejector cylinder switch (blue)	0 = Switch not pushed 1 = Switch pushed
E5	B23	Feed rake speed sensor (blue) inside	0 = Standstill Changes between 0 and 1 when feed rake rotates 1 = Wire ends connected
E6	B9	Drive speed sensor (red) outside	0 = Standstill Changes between 0 and 1 when PTO shaft rotates 1 = Wire ends connected
E7	B69	Metering wheel / bale length sensor signal B	Changes between 0 and 1 when metering wheel rotates
E8	B69	Metering wheel / bale length sensor signal A	Changes between 0 and 1 when metering wheel rotates

1.5　Output testing (up to module 1 no. 835024.2)
Testing the actuation by the modules

```
S e r v i c e   1                         8 / 1
P =     0 L 0 , 0 0           N 0 =       0
P 0 ┌─────────┐     0           N 1 =       0
    │         │
P 1 │         │     0           N 2 =       0
    └─────────┘
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0           U : 1 1 , 6
F : 0 0 0 0 0 0 0 0               F F F F
```

1 2 3 4 5 6 7 8

Eight numeric characters are available for output diagnosis in line "A" on page "8 / 1 (Service 1)" and page "8 / 2 (Service RC)", each of them being assigned to one circuit. It must be ensured that the baling pressure solenoid valves (P0 and P1) are not activated. To achieve this, press the "Plus key" once.
The numeric characters only indicate if a solenoid valve is actuated by the corresponding module.
For diagnosis purposes, the corresponding function must be activated, i.e. the functions can be checked only one by one.
The numeric characters may assume the following values:

　　　　　0 = Solenoid valve is not actuated by the module
　　　　　or
　　　　　1 = Solenoid valve is actuated by the module.

Dependencies and switching sequences which may occur in normal operation have an influence.

The table below applies to page "8 / 1 (Service 1)"

Numeric character	Designation		Display
A1	None	Free	No function
A2	None	Free	No function
A3	None	Free	No function
A4	None	Free	No function
A5	Y12	Retract bale ejector cylinder solenoid coil	0 = not activated 1 = activated
A6	Y11	Extend bale ejector cylinder solenoid coil	0 = not activated 1 = activated
A7	Y77	Circulation shut-off valve solenoid coil	0 = not activated 1 = activated
A8	Y58	Rotor blocking solenoid coil	0 = not activated 1 = activated

Output testing, continued (up to module 1 no. 835024.2)
Testing the actuation by the modules

```
S e r v i c e   R C                    8 / 2
W = + 2 0                        N 0 =        0
                                 N 1 =        0
                                 N 2 =        0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0              U : 1 1 , 6
F : 0 0 0 0 0 0 0 0               F F F F
```

```
1 2 3 4 5 6 7 8
```

The table below applies to page "8 / 2 (Service RC)"
For diagnosis purposes, the corresponding function must be activated, i.e. the functions can be checked only one by one.

Numeric character	Designation		Display
A1	None	Free	No function
A2	None	Free	No function
A3	None	Free	No function
A4	None	Free	No function
A5	Y64	Close cutting frame solenoid coil	0 = not activated 1 = activated
A6	Y63	Open cutting frame solenoid coil	0 = not activated 1 = activated
A7	Y54	ROTOCUT knives OFF solenoid coil	0 = not activated 1 = activated
A8	Y55	ROTOCUT knives ON solenoid coil	0 = not activated 1 = activated

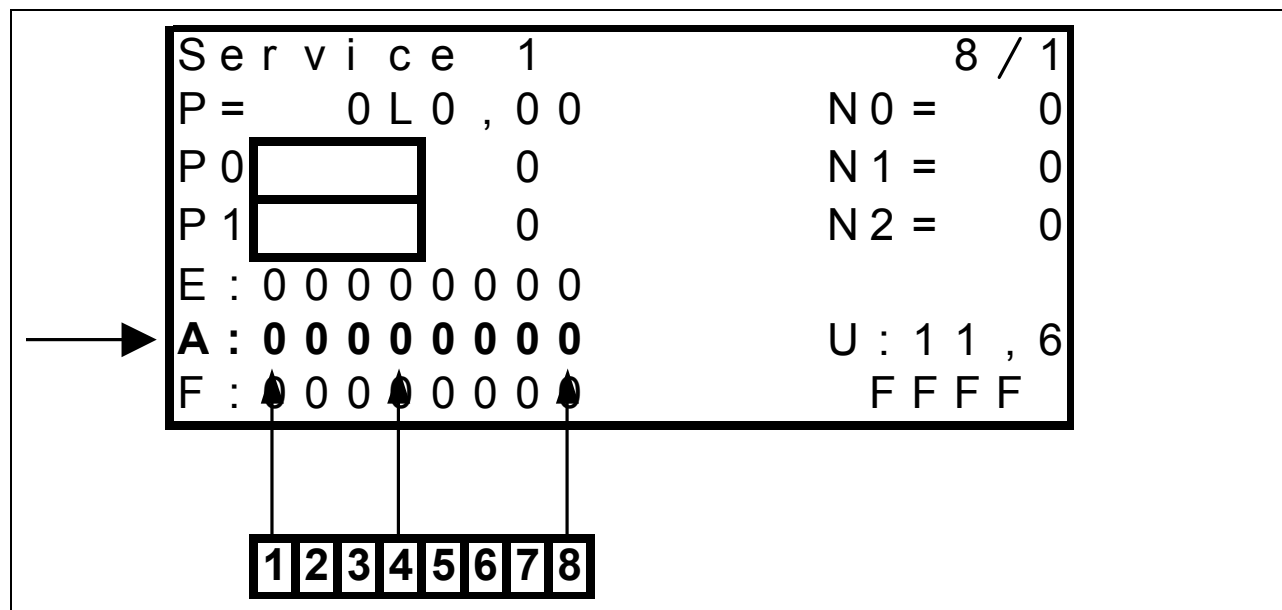**Output testing, continued (up to module 1 no. 835024.2)**
Continuity test

```
┌─────────────────────────────────────────────────────┐
│  S e r v i c e   1                          8 / 1    │
│  P =     0 L 0 , 0 0              N 0 =          0    │
│  P 0 ┌──────────┐      0          N 1 =          0    │
│  P 1 ├──────────┤      0          N 2 =          0    │
│      └──────────┘                                     │
│  E : 0 0 0 0 0 0 0 0                                  │
│  A : 0 0 0 0 0 0 0 0              U : 1 1 , 6          │
│  F : 0 0 0 0 0 0 0 0                  F F F F          │
└─────────────────────────────────────────────────────┘

         1 2 3 4 5 6 7 8
```

To activate this function, keep the "Minus key" pressed while in the service menu, i.e. a maximum of eight circuits may be checked at the same time.
Eight numeric characters are available for output diagnosis in line "A", each of them being assigned to one circuit.
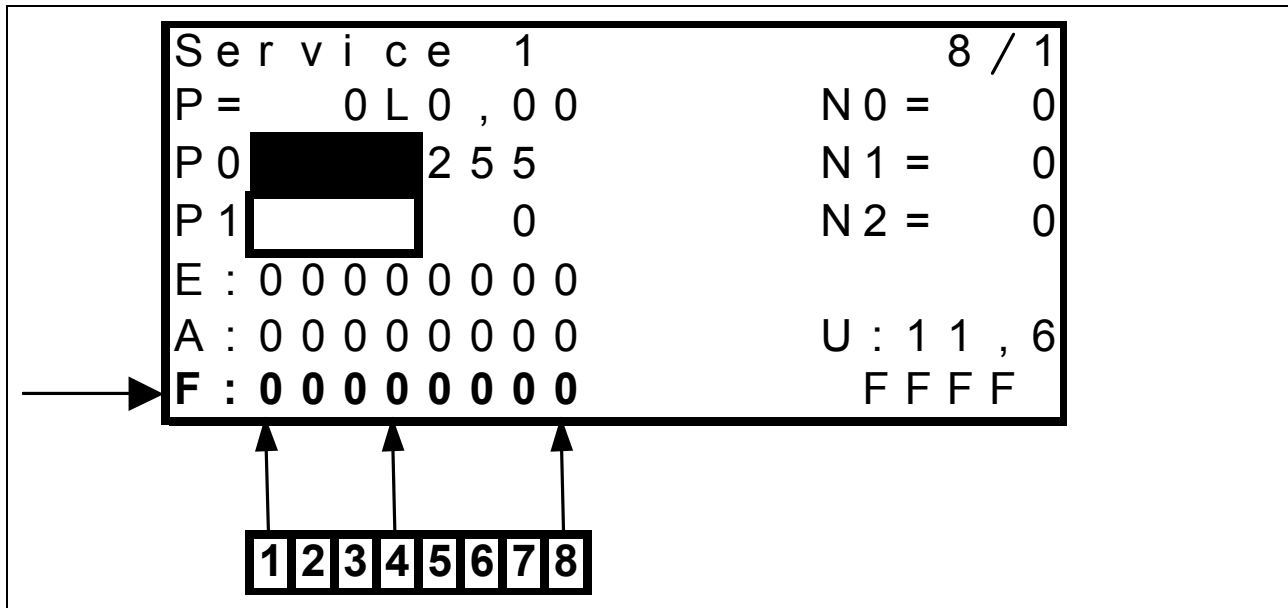The numeric characters may assume the following values:

0 = Circuit open or
1 = Circuit closed and/or solenoid coil OK.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

Numeric character	Designation		Display
A1	None	Free	Not relevant
A2	Y58	Rotor blocking solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A3	Y77	Circulation shut-off valve solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A4	None	Free	No function
A5	None	Free	No function
A6	K92	Wrapping release motor relay	0 = Circuit interrupted 1 = Relay circuit OK (85 to 86)
A7	Y51	Baling pressure relief solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A8	Y50	Baling pressure build-up solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK

1.6　Error display (up to module 1 no. 835024.2)

```
S e r v i c e   1                    8 / 1
P =     0 L 0 , 0 0           N 0 =      0
P 0 ███████ 2 5 5            N 1 =      0
P 1 ▭▭▭▭▭     0             N 2 =      0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0           U : 1 1 , 6
F : 0 0 0 0 0 0 0 0              F F F F
```

```
1 2 3 4 5 6 7 8
```

Eight numeric characters are available for error display in line "F", each of them being assigned to one error.
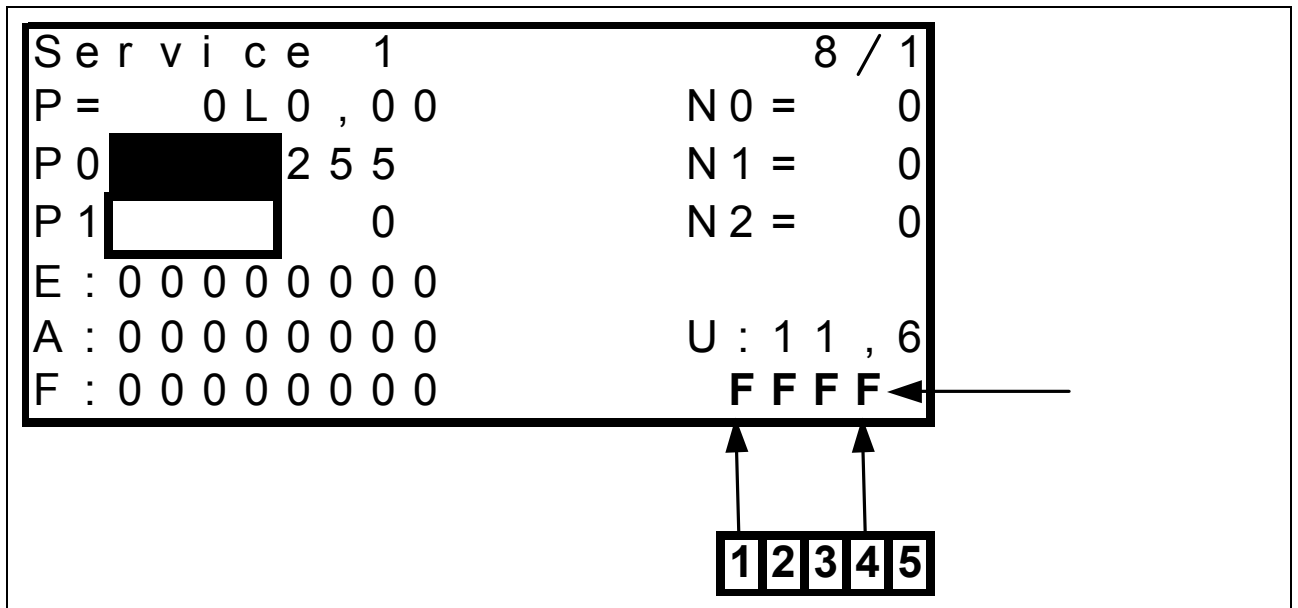**This function is available only on page 8/1 "Service 1".**
The numeric characters may assume the following values:

> 0 = No error or
> 1 = Error.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

Numeric character	Reason	Remark	Symbol in work menu
F1	Cutting frame not closed	Cutting frame should be closed, but cutting frame position sensor indicates an angle above 0°	
F2	System fault (CAN bus)	No signal from CAN bus or module defective	
F3	Rotor overload	Drive speed above 500 rpm and rotor speed below 56 rpm	
F4	Feed rake overload	Drive speed above 500 rpm and feed rake speed below 60 rpm	
F5	Tying fault	See Electric System documentation Circuit diagram 11a, b (Tying fault sequence diagram)	
F6	Free	No function	
F7	Circulation shut-off valve activated too long	Circulation shut-off valve activated longer than allowed in connection with baling pressure build-up solenoid coil (more than 50 % actuated time within 3 min.)	
F8	Twine break	Twine break switch contact	

1.7 Key test (up to module 1 no. 835024.2)

```
S e r v i c e   1                    8 / 1
P =      0 L 0 , 0 0        N 0 =      0
P 0 ████████ 2 5 5         N 1 =      0
P 1 ░░░░░░░░      0         N 2 =      0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0                    U : 1 1 , 6
F : 0 0 0 0 0 0 0 0                    F F F F ◄──────

                                      ↑        ↑
                                   ┌─┬─┬─┬─┬─┐
                                   │1│2│3│4│5│
                                   └─┴─┴─┴─┴─┘
```

Four numeric characters are available for key testing in line (1) shown above.

Pushing a key on the Control Terminal produces one of the combinations of numbers and characters shown below which allow checking the function.

The character "G" at the 5th digit indicates if the central lubrication system is currently active, otherwise this digit remains free.

Example: When the central lubrication system is active and the "Minus" key is pressed, the numeric characters read "FDFFG". If the central lubrication system is not active and the "Minus Key" is pressed, the numeric characters read "FDFF".

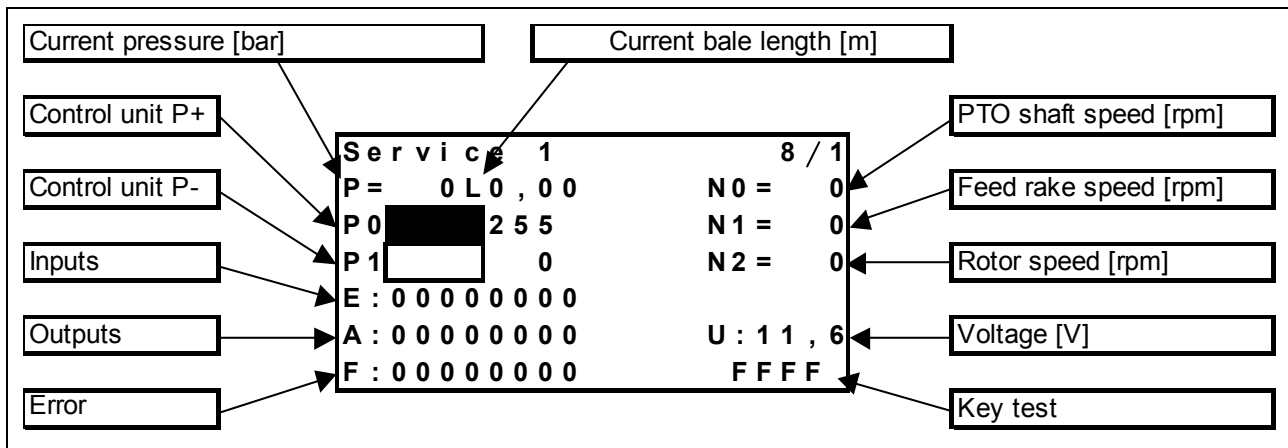| Key	Designation	Display			
		1	**2**	**3**	**4**
🖳	Scroll through main menu	E	F	F	F
🖳	Scroll through second screen	D	F	F	F
↕	ROTOCUT knives ON	B	F	F	F
	ROTOCUT knives OFF	7	F	F	F
⋮	Build up / relieve baling pressure	F	E	F	F
−	Minus	F	D	F	F
+	Plus	F	F	D	F
↕	Close cutting frame	F	B	F	F
	Open cutting frame	F	7	F	F
⟳	Manual tying	F	F	E	F
→	Right arrow key	F	F	B	F
←	Left arrow key	F	F	7	F

2.0 Control terminal service menu (from module 1 no. 835024.3)

2.1 Service menu structure
(from module 1 no. 835024.3)

This menu serves as a tool in fault-finding. It shows the status of various electrical components such as e.g. speed, voltage, pressure, switch positions.
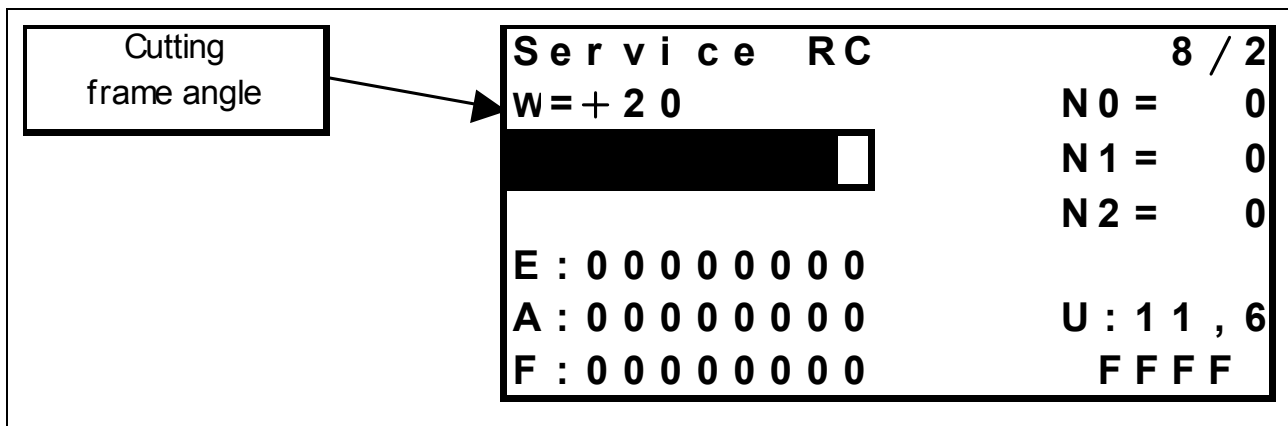
To enter the service menu, press the keys "Scroll main menu", "Plus key" and "Minus key" at the same time.
The following mask appears:

Page "8/1 (Service 1)"

Current pressure [bar]	Current bale length [m]

Control unit P+	PTO shaft speed [rpm]
Control unit P-	Feed rake speed [rpm]
Inputs	Rotor speed [rpm]
Outputs	Voltage [V]
Error	Key test

```
Service  1          8 / 1
P =    0 L 0 , 0 0      N 0 =      0
P 0            2 5 5    N 1 =      0
P 1              0      N 2 =      0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0    U : 1 1 , 6
F : 0 0 0 0 0 0 0 0        F F F F
```

Page "8/2 (Service RC)"
(press "Sub-menu" key one more time)

Cutting frame angle

```
Service  RC         8 / 2
W = + 2 0              N 0 =      0
                      N 1 =      0
                      N 2 =      0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0    U : 1 1 , 6
F : 0 0 0 0 0 0 0 0        F F F F
```
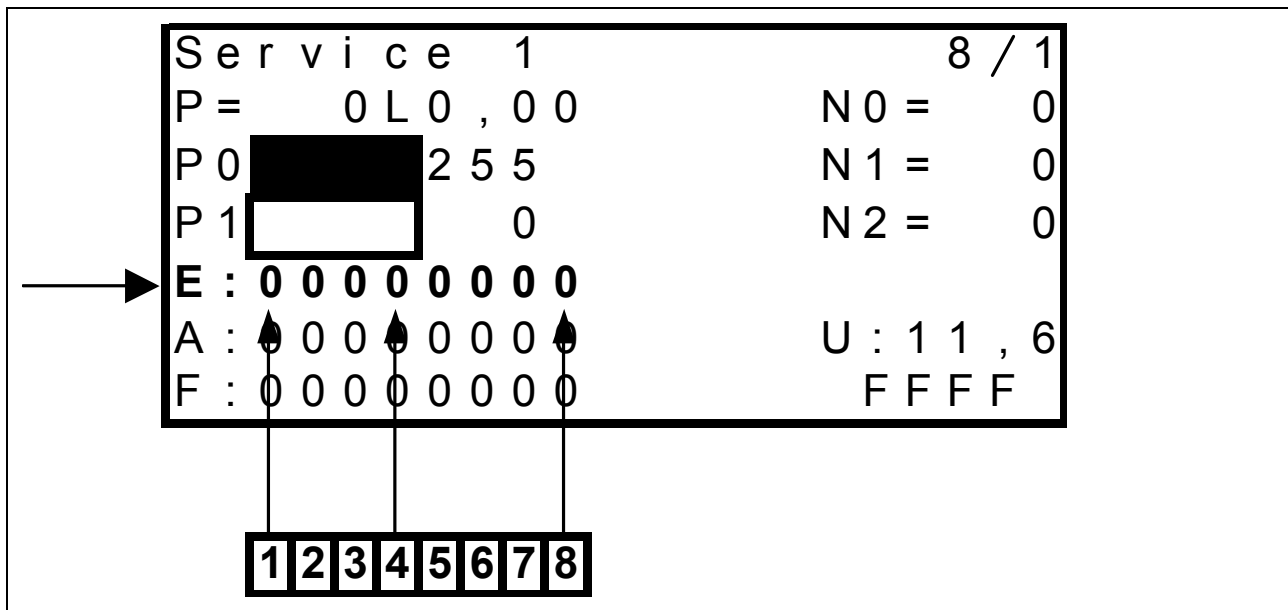
2.2   Additional information about page "8/1 (Service 1)" (from module 1 no. 835024.3)

Menu item	Remark
(P=) Current pressure	The pressure in the baling chamber cylinders is displayed here in bars.
(L) Current bale length	The length of the bale in the baling chamber is displayed here in metres to the second decimal point.
(N0=) PTO shaft speed	The calculated PTO shaft speed in revolutions per minute is displayed here (this speed is measured by the drive speed sensor).
(N1=) Feed rake speed	The feed rake speed in revolutions per minute is displayed here (150 rpm at 1000 rpm PTO shaft speed)
(N2=) Rotor speed	The rotor speed in revolutions per minute is displayed here (140 rpm at 1000 rpm PTO shaft speed)
(U:) Voltage	The supply voltage is displayed here in Volt to the first decimal point.
Key test	A combination of characters and numbers is displayed here to test the function of the keys on the Control Terminal.
(P0) Control unit P+	The condition of the baling pressure build-up valve is displayed here. The displayed number is proportional with the valve actuation and may assume values from 0 to 255. 0 = Valve not actuated 255 = Valve fully actuated
(P1) Control unit P-	The condition of the baling pressure relief valve is displayed here. The displayed number is proportional with the valve actuation and may assume values from 0 to 255. 0 = Valve not actuated 255 = Valve fully actuated
(E:) Inputs	The condition of various circuits connected with the modules is displayed here. Each numeric character corresponds to one circuit. 0 = Circuit open 1 = Circuit closed
(A:) Outputs	The condition of various circuits connected with the modules is displayed here. Each numeric character corresponds to one circuit. 0 = Circuit open 1 = Circuit closed
(F:) Error	Malfunctions are displayed here. Each numeric character corresponds to one error. 0 = No error 1 = Error

2.3   Additional information about page "8/2 (Service RC)" (up to module 1 no. 835024.3)

(W=) Cutting frame angle	The cutting frame angle in degrees is displayed here. The higher the value, the wider the cutting frame is open.

2.4   Input testing (from module 1 no. 835024.3)
Continuity test

```
Service 1                    8 / 1
P =    0 L 0 , 0 0        N 0 =      0
P 0 ██████ 2 5 5         N 1 =      0
P 1 ░░░░░░      0         N 2 =      0
E : 0 0 0 0 0 0 0 0
A : ● 0 0 ● 0 0 0 ●       U : 1 1 , 6
F : 0 0 0 0 0 0 0 0            F F F F
```

```
1 2 3 4 5 6 7 8
```

Eight numeric characters are available for input diagnosis in line "E" on page "8 / 1 (Service 1)" and page "8 / 2 (Service RC)", each of them being assigned to one circuit.
The numeric characters may assume the following values:

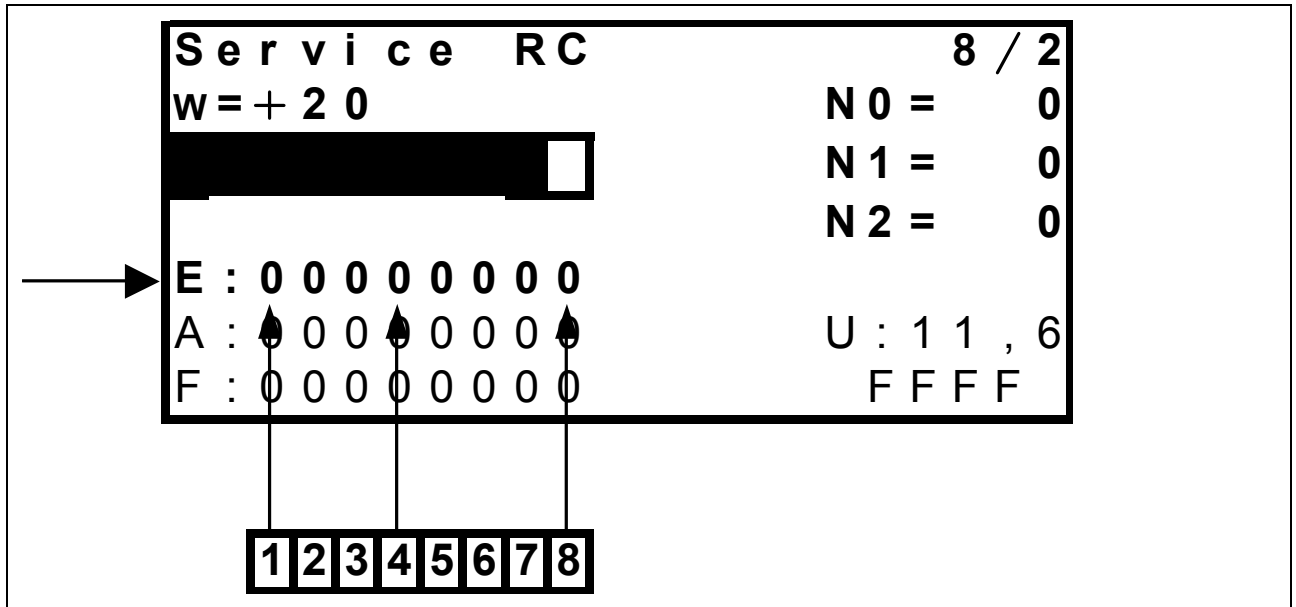   0 = Circuit open or
        1 = Circuit closed.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

The table below applies to page "8 / 1 (Service 1)"

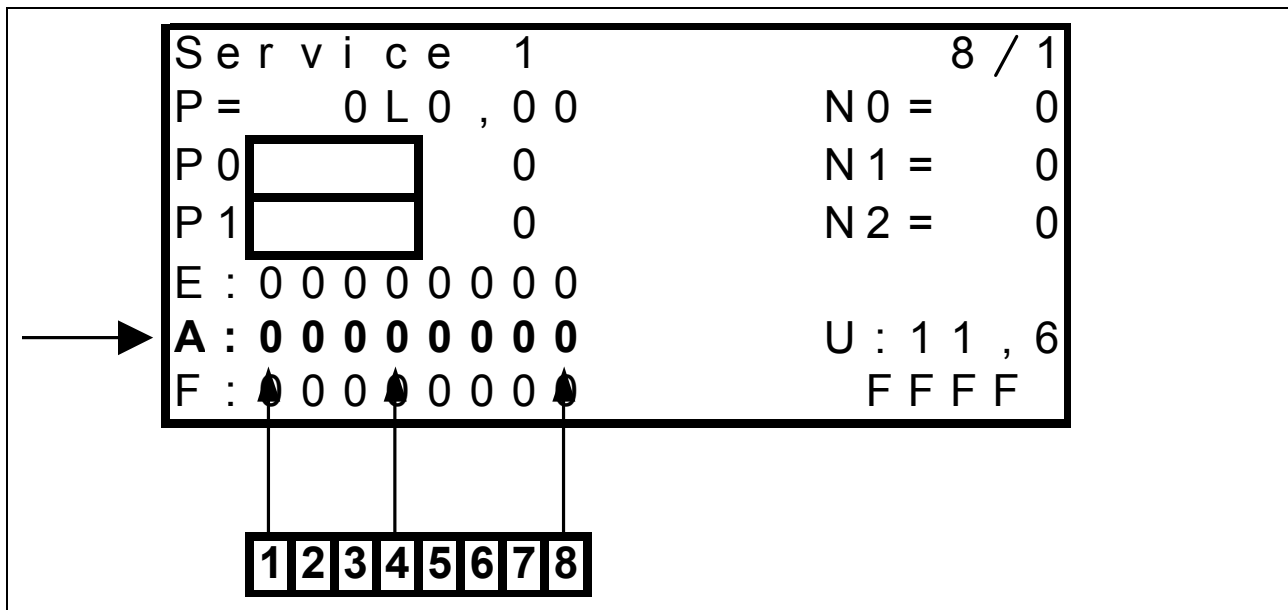| Numeric character	Designation		Display
E1	U5	Emergency operation switch	1 = Normal operation switch 0 = Emergency operation switch
E2	None	Free	No function
E3	Z11	Twine break left/right actual value switch	0 = Operating status (normal) 1 = Twine break
E4	Z63	Tying system monitoring actual value switch	0 = Switch pushed 1 = Switch not pushed
E5	B23	Feed rake speed sensor (blue) inside	0 = Standstill Changes between 0 and 1 when feed rake rotates 1 = Wire ends connected
E6	B9	Drive speed sensor (red) outside	0 = Standstill Changes between 0 and 1 when feed rake rotates 1 = Wire ends connected
E7	B69	Metering wheel / bale length sensor - signal B	Changes between 0 and 1 when metering wheel rotates
E8	B69	Metering wheel / bale length sensor - signal A	Changes between 0 and 1 when metering wheel rotates

Input testing, continued (from module 1 no. 835024.3)
Continuity test

```
Service  RC              8 / 2
w = + 2 0               N 0 =     0
                        N 1 =     0
                        N 2 =     0

E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0     U : 1 1 , 6
F : 0 0 0 0 0 0 0 0        F F F F
```

```
1 2 3 4 5 6 7 8
```

The table below applies to page "8 / 2 (Service RC)"

Numeric character	Designation		Display
E1	None	Free	No function
E2	None	Free	No function
E3	None	Free	No function
E4	Z49	ROTOCUT knives ON actual value switch	0 = Switch not actuated 1 = Switch actuated
E5	Z56	Flywheel brake actual value switch	1 = Switch actuated 0 = Switch not actuated
E6	U2	Retract bale ejector cylinder switch - (red)	1 = Switch actuated 0 = Switch not actuated
E7	U1	Extend bale ejector cylinder switch U2 - (blue)	1 = Switch actuated 0 = Switch not actuated
E8	B24	Rotor speed sensor	0 = Standstill Changes between 0 and 1 when rotor rotates 1 = Wire ends connected

2.5   Output testing (from module 1 no. 835024.3)
Testing the actuation by the modules

```
S e r v i c e   1                         8 / 1
P =      0 L 0 , 0 0              N 0 =        0
P 0                      0        N 1 =        0
P 1                      0        N 2 =        0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0              U : 1 1 , 6
F : 0 0 0 0 0 0 0 0                  F F F F
```

```
1 2 3 4 5 6 7 8
```

Eight numeric characters are available for output diagnosis in line "A" on page "8 / 1 (Service 1)" and page "8 / 2 (Service RC)", each of them being assigned to one circuit.
It must be ensured that the baling pressure solenoid valves (P0 and P1) are not activated. To achieve this, press the "Plus key" once.
The numeric characters only indicate if a solenoid valve is actuated by the corresponding module.
For diagnosis purposes, the corresponding function must be activated, i.e. the functions can be checked only one by one.
The numeric characters may assume the following values:
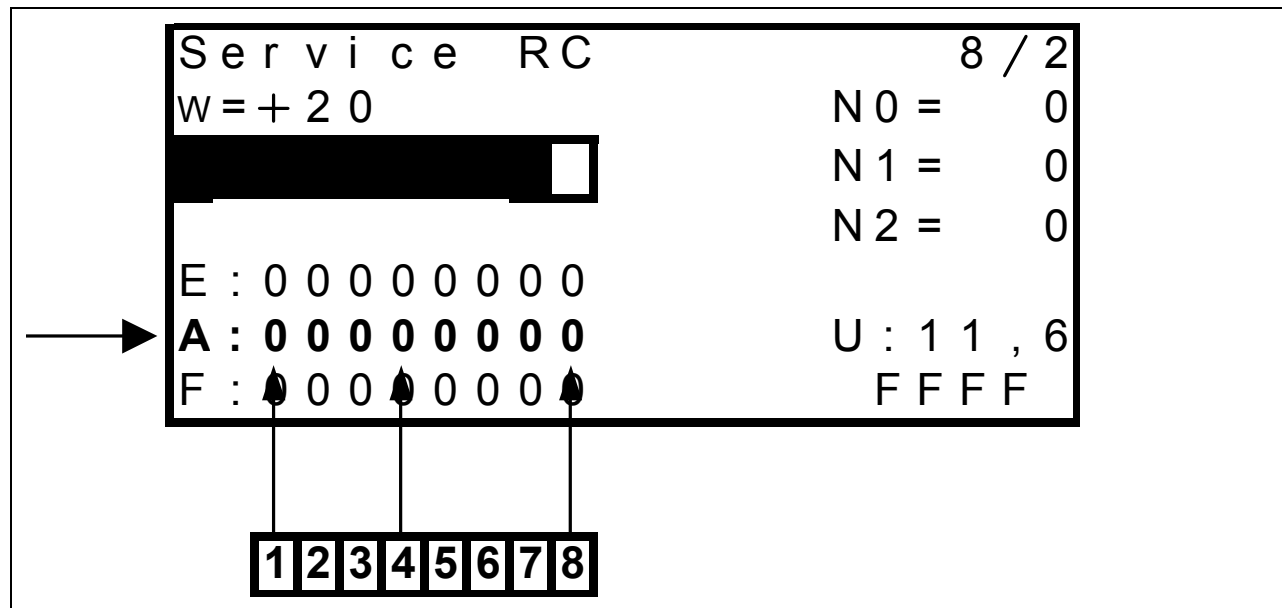
> 0 = Solenoid valve is not actuated by the module
> or
> 1 = Solenoid valve is actuated by the module.

Dependencies and switching sequences which may occur in normal operation have an influence.

The table below applies to page "8 / 1 (Service 1)"

Numeric character	Designation		Display
A1	None	Free	No function
A2	None	Free	No function
A3	None	Free	No function
A4	Y58	Rotor blocking solenoid coil	0 = not activated 1 = activated
A5	Y77	Circulation shut-off valve solenoid coil	0 = not activated 1 = activated
A6	K92	Tying release motor relay	0 = not activated 1 = activated
A7	Y51	Baling pressure relief solenoid coil	0 = not activated 1 = activated
A8	Y50	Baling pressure build-up solenoid coil	0 = not activated 1 = activated

Output testing, continued (from module 1 no. 835024.3)
Testing the actuation by the modules

```
S e r v i c e    R C                        8 / 2
W = + 2 0                        N 0 =      0
                                 N 1 =      0
                                 N 2 =      0

E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0              U : 1 1 , 6
F : 0 0 0 0 0 0 0 0                F F F F

            1 2 3 4 5 6 7 8
```
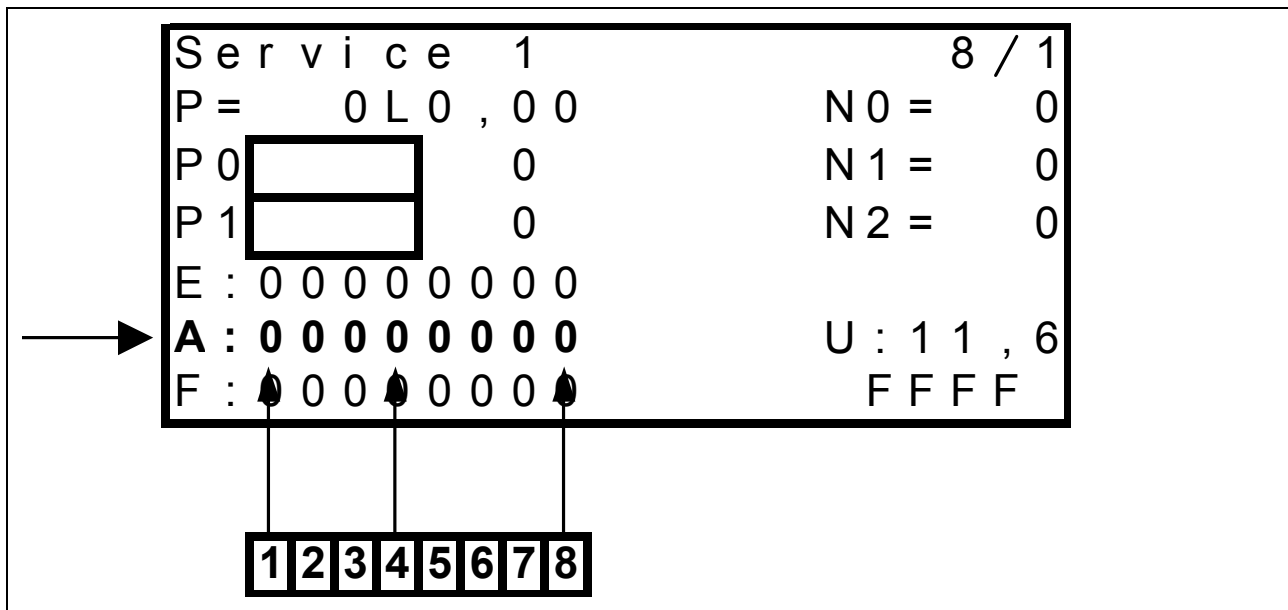
The table below applies to page "8 / 2 (Service RC)"
For diagnosis purposes, the corresponding function must be activated, i.e. the functions can be checked only one by one.

Numeric character	Designation		Display
A1	Y63	Open cutting frame solenoid coil	0 = not activated 1 = activated
A2	Y64	Close cutting frame solenoid coil	0 = not activated 1 = activated
A3	Y55	ROTOCUT knives ON solenoid coil	0 = not activated 1 = activated
A4	Y54	ROTOCUT knives OFF solenoid coil	0 = not activated 1 = activated
A5	M25	Central lubrication system motor	0 = not activated 1 = activated
A6	Y12	Retract bale ejector cylinder solenoid coil	0 = not activated 1 = activated
A7	Y11	Extend bale ejector cylinder solenoid coil	0 = not activated 1 = activated
A8	Y31	Knotter cleaning solenoid coil (when set to 2.5 s blowing time)	0 = not activated 1 = activated

Output testing, continued (from module 1 no. 835024.3)
Continuity test

```
Service 1                    8 / 1
P =     0 L 0 , 0 0          N 0 =       0
P 0 [        ]    0          N 1 =       0
P 1 [        ]    0          N 2 =       0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0          U : 1 1 , 6
F : ● 0 0 ● 0 0 0 ●            F F F F

        1 2 3 4 5 6 7 8
```

To activate this function, keep the "Minus key" pressed while in the service menu, i.e. a maximum of eight circuits may be checked at the same time.

Eight numeric characters are available for output diagnosis in line "A" on page "8 / 1 (Service 1)" and page "8 / 2 (Service RC)", each of them being assigned to one circuit.
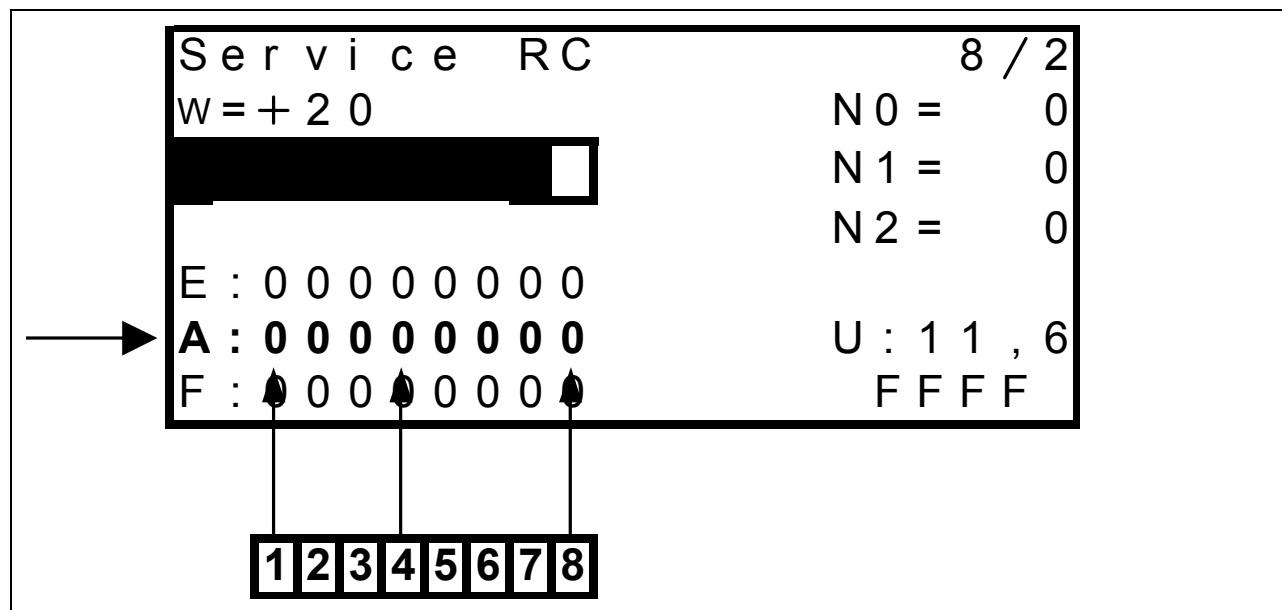
The numeric characters may assume the following values:

          0 = Circuit open or

          1 = Circuit closed and/or solenoid coil OK.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

The table below applies to page "8 / 1 (Service 1)"

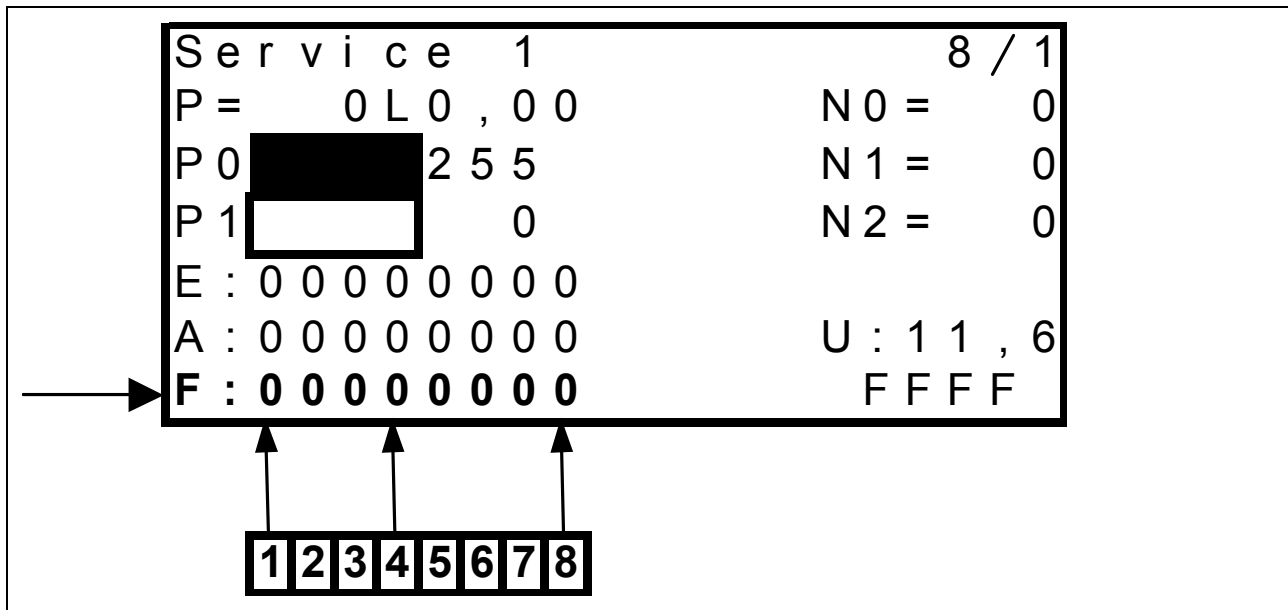| Numeric character	Designation		Display
A1	None	Free	No function
A2	None	Free	No function
A3	None	Free	No function
A4	Y58	Rotor blocking solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A5	Y77	Circulation shut-off valve solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A6	K92	Tying release motor relay	0 = Circuit interrupted 1 = Relay circuit OK (85 to 86)
A7	Y51	Baling pressure relief solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A8	Y50	Baling pressure build-up solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK

Output testing, continued (from module 1 no. 835024.3)
Continuity test

```
┌──────────────────────────────────────────────────────────────┐
│   S e r v i c e    R C                         8 / 2          │
│   W = + 2 0                          N 0 =        0           │
│   ████████████████████  ▢                                    │
│                                      N 1 =        0           │
│                                      N 2 =        0           │
│   E : 0 0 0 0 0 0 0 0                                         │
│ ➤ A : 0 0 0 0 0 0 0 0               U : 1 1 , 6               │
│   F : ♦ 0 0 ♦ 0 0 0 ♦                 F F F F                 │
│                                                              │
│                                                              │
│         ┌─┬─┬─┬─┬─┬─┬─┬─┐                                     │
│         │1│2│3│4│5│6│7│8│                                     │
│         └─┴─┴─┴─┴─┴─┴─┴─┘                                     │
└──────────────────────────────────────────────────────────────┘
```

The table below applies to page "8 / 2 (Service RC)"
To activate this function, keep the "Minus key" pressed while in the service menu, i.e. a maximum of eight circuits may be checked at the same time.

Numeric character	Designation		Display
A1	Y63	Open cutting frame solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A2	Y64	Close cutting frame solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A3	Y55	ROTOCUT knives ON solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A4	Y54	ROTOCUT knives OFF solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A5	M25	Central lubrication system motor	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A6	Y12	Retract bale ejector cylinder solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A7	Y11	Extend bale ejector cylinder solenoid coil	0 = Circuit interrupted 1 = Solenoid coil circuit OK
A8	Y31	Knotter cleaning solenoid coil (when set to 2.5 s blowing time)	0 = Circuit interrupted 1 = Solenoid coil circuit OK

2.6 Error display (from module 1 no. 835024.3)

```
S e r v i c e   1                    8 / 1
P =     0 L 0 , 0 0         N 0 =       0
P 0 █████     2 5 5        N 1 =       0
P 1 □□□□        0          N 2 =       0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0                U : 1 1 , 6
F : 0 0 0 0 0 0 0 0                  F F F F
```

```
1 2 3 4 5 6 7 8
```

Eight numeric characters are available for error display in line "F", each of them being assigned to one error.
This function is available only on page 8/1 "Service 1".
The numeric characters may assume the following values:

0 = No error or

1 = Error.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

Numeric character	Reason	Remark	Symbol in work menu
F1	Cutting frame not closed	Cutting frame should be closed, but cutting frame position sensor indicates an angle above 0°	
F2	System fault (CAN bus)	No signal from CAN bus or module defective	
F3	Rotor overload	Drive speed above 500 rpm and rotor speed below 56 rpm	
F4	Feed rake overload	Drive speed above 500 rpm and feed rake speed below 60 rpm	
F5	Tying fault	See Electric System documentation Circuit diagram 11a, b (Tying fault sequence diagram)	
F6	Free	No function	
F7	Circulation shut-off valve activated too long	Circulation shut-off valve activated longer than allowed in connection with baling pressure build-up solenoid coil (more than 50 % actuated time within 3 min.)	
F8	Twine break	Twine break switch contact	

2.7 Key test (from module 1 no. 835024.3)

```
S e r v i c e   1                          8 / 1
P =       0 L 0 , 0 0         N 0 =        0
P 0 ████████ 2 5 5           N 1 =        0
P 1 ▭▭▭▭▭      0             N 2 =        0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0          U : 1 1 , 6
F : 0 0 0 0 0 0 0 0               F F F F ◄─────
```

```
1 2 3 4 5
```

Four numeric characters are available for key testing in line (1) shown above.

Pushing a key on the Control Terminal produces one of the combinations of numbers and characters shown below which allow checking the function.

The character "G" at the 5th digit indicates if the central lubrication system is currently active, otherwise this digit remains free.

Example: When the central lubrication system is active and the "Minus" key is pressed, the numeric characters read "FDFFG". If the central lubrication system is not active and the "Minus Key" is pressed, the numeric characters read "FDFF".

| Key	Designation	Display			
		1	2	3	4
	Scroll through main menu	E	F	F	F
	Scroll through second screen	D	F	F	F
	ROTOCUT knives ON	B	F	F	F
	ROTOCUT knives OFF	7	F	F	F
	Build up / relieve baling pressure	F	E	F	F
	Minus	F	D	F	F
	Plus	F	F	D	F
	Close cutting frame	F	B	F	F
	Open cutting frame	F	7	F	F
	Manual tying	F	F	E	F
	Right arrow key	F	F	B	F
	Left arrow key	F	F	7	F

3.0   Control terminal service menu (on CCU module)

3.1   Service menu structure (on CCU module)

This menu serves as a tool in fault-finding. It shows the status of various electrical components such as e.g. speed, voltage, pressure, switch positions.
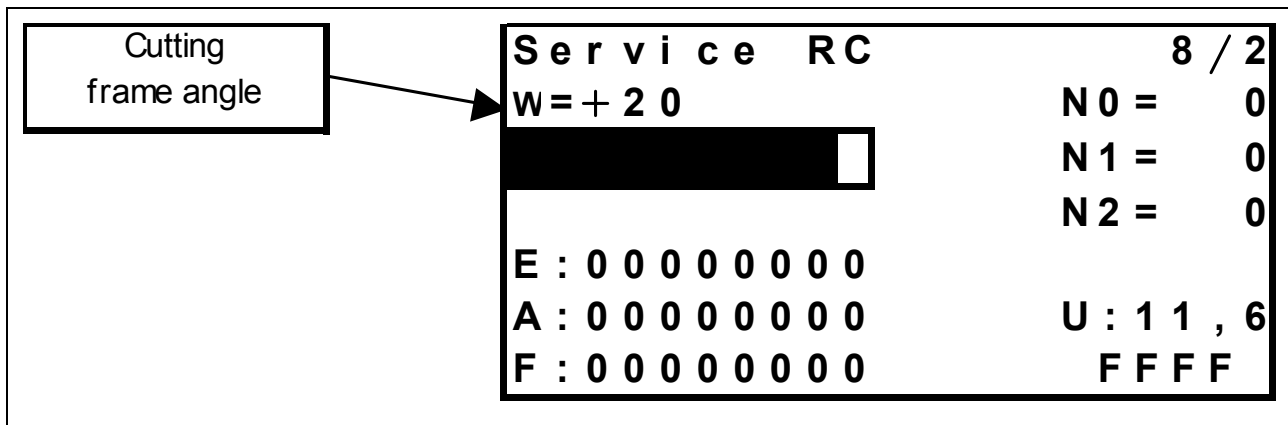
To enter the service menu, press the keys "Scroll main menu", "Plus key" and "Minus key" at the same time.
The following mask appears:
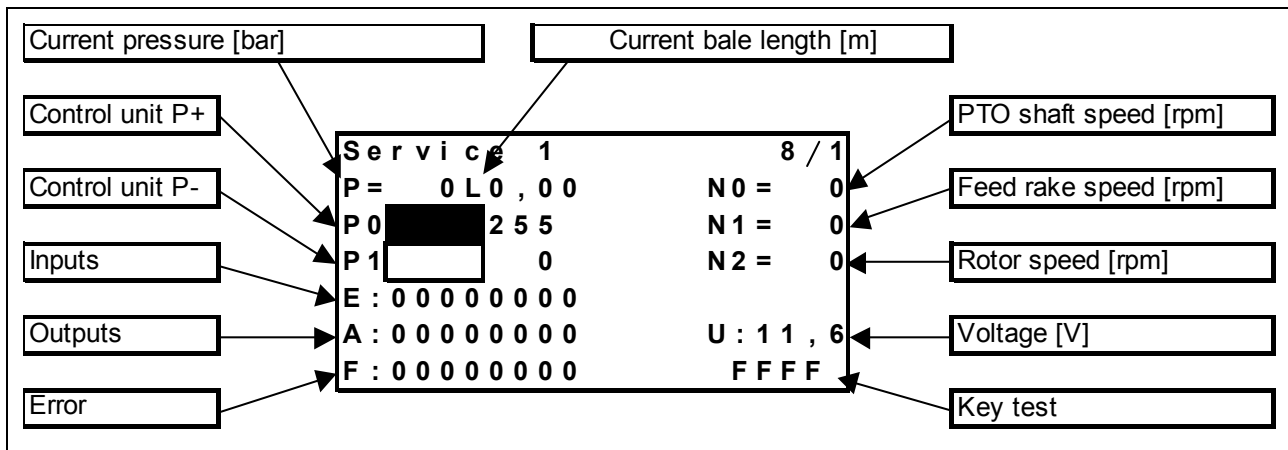
Page "8/1 (Service 1)"

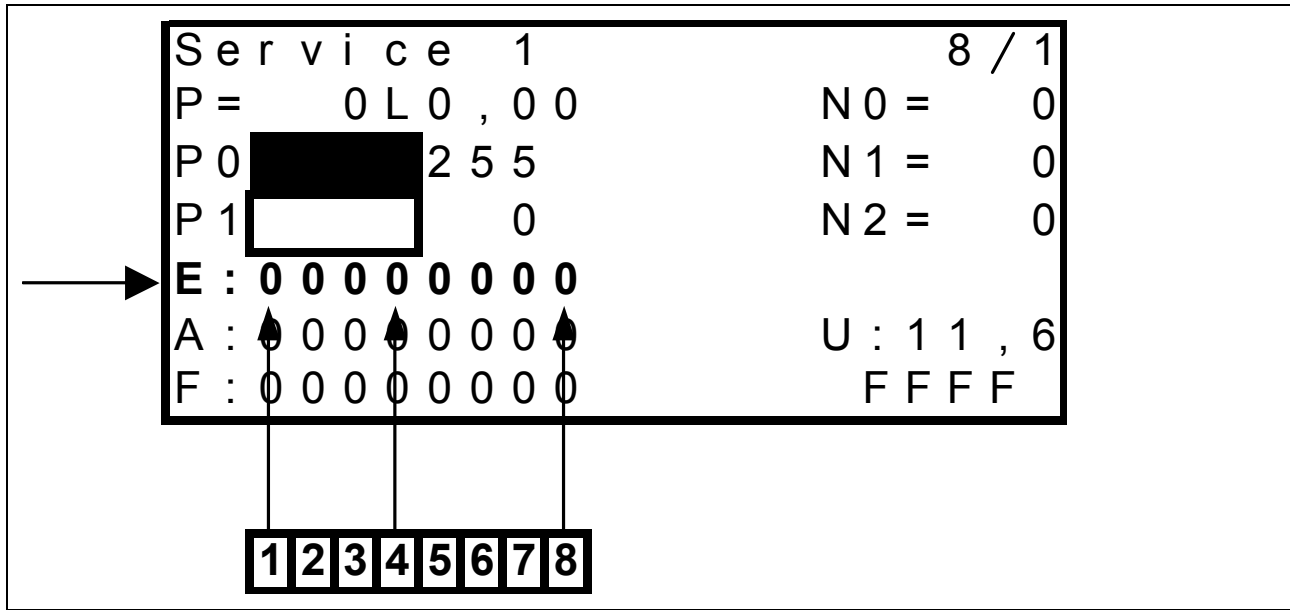**Page "8/2 (Service RC)"**
(press "Sub-menu" key one more time)

3.2   Additional information about page "8/1 (Service 1)" (on CCU module)

Menu item	Remark
(P=) Current pressure	The pressure in the baling chamber cylinders is displayed here in bars.
(L) Current bale length	The length of the bale in the baling chamber is displayed here in metres to the second decimal point.
(N0=) PTO shaft speed	The calculated PTO shaft speed in revolutions per minute is displayed here (this speed is measured by the drive speed sensor).
(N1=) Feed rake speed	The feed rake speed in revolutions per minute is displayed here (150 rpm at 1000 rpm PTO shaft speed)
(N2=) Rotor speed	The rotor speed in revolutions per minute is displayed here (140 rpm at 1000 rpm PTO shaft speed)
(U:) Voltage	The supply voltage is displayed here in Volt to the first decimal point.
Key test	A combination of characters and numbers is displayed here to test the function of the keys on the Control Terminal.
(P0) Control unit P+	The condition of the baling pressure build-up valve is displayed here. The displayed number is proportional with the valve actuation and may assume values from 0 to 255. 0 = Valve not actuated 255 = Valve fully actuated
(P1) Control unit P-	The condition of the baling pressure relief valve is displayed here. The displayed number is proportional with the valve actuation and may assume values from 0 to 255. 0 = Valve not actuated 255 = Valve fully actuated
(E:) Inputs	The condition of various circuits connected with the modules is displayed here. Each numeric character corresponds to one circuit. 0 = Circuit open 1 = Circuit closed
(A:) Outputs	The condition of various circuits connected with the modules is displayed here. Each numeric character corresponds to one circuit. 0 = Circuit open 1 = Circuit closed
(F:) Error	Malfunctions are displayed here. Each numeric character corresponds to one error. 0 = No error 1 = Error

3.3   Additional information about page "8/2 (Service RC)" (on CCU module)

(W=) Cutting frame angle	The cutting frame angle in degrees is displayed here. The higher the value, the wider the cutting frame is open.

3.4   Input testing (on CCU module)
Continuity test

```
  S  r v i c e  1                    8 / 1
  P =     0 L 0 , 0 0          N 0 =      0
  P 0 █████  2 5 5             N 1 =      0
  P 1 ░░░░░      0             N 2 =      0
➤ E : 0 0 0 0 0 0 0 0
  A : ♦ 0 0 ♦ 0 0 0 ♦         U : 1 1 , 6
  F : 0 0 0 0 0 0 0 0              F F F F
```

```
1 2 3 4 5 6 7 8
```

Eight numeric characters are available for input diagnosis in line "E" on page "8 / 1 (Service 1)", each of them being assigned to one circuit.
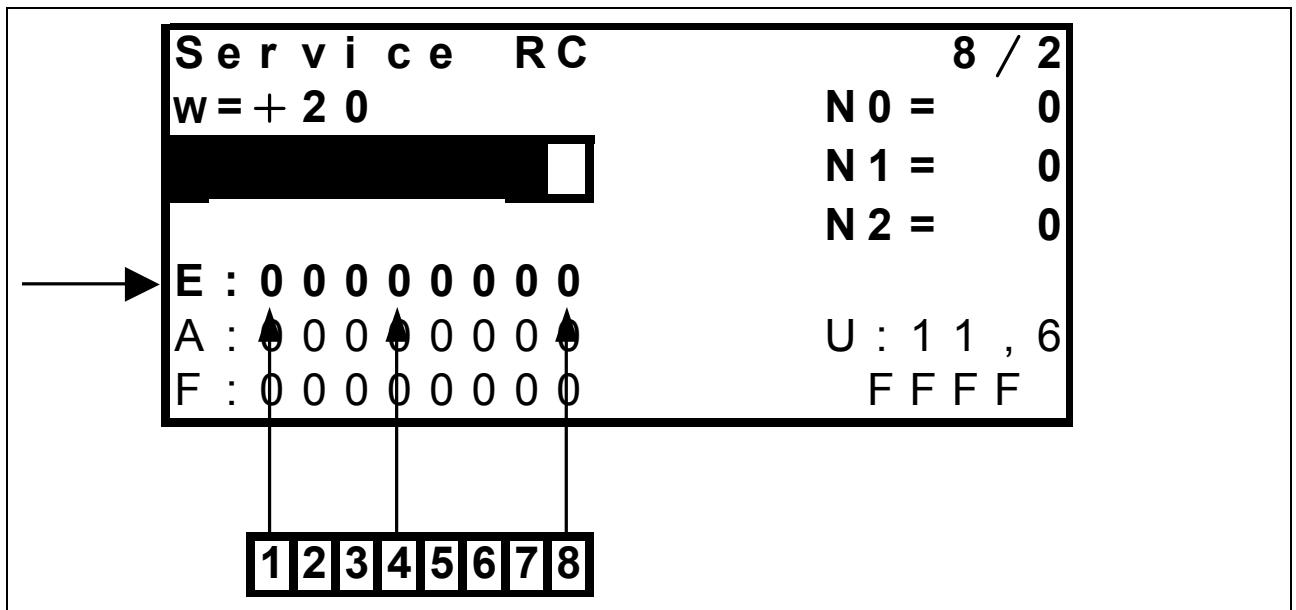The numeric characters may assume the following values:

0 = Circuit open or
1 = Circuit closed.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

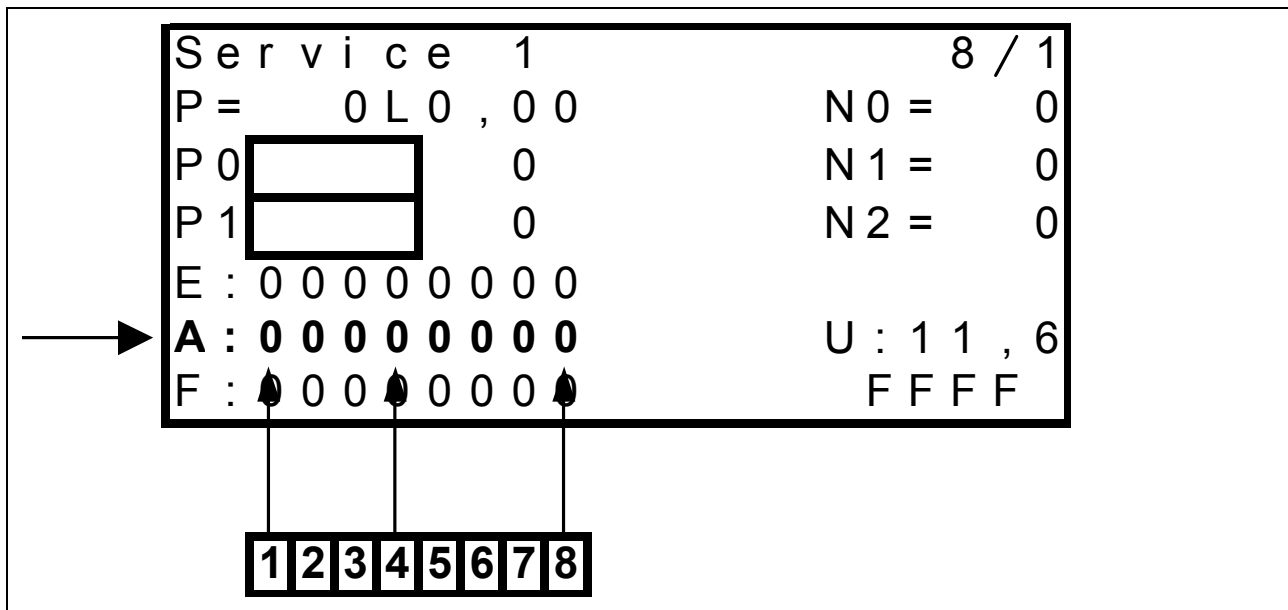The table below applies to page "8 / 1 (Service 1)"

Numeric character	Designation		Display
E1	Z11	Twine break left/right actual value switch	1 = Twine break 0 = No twine break
E2	Z63	Tying system monitoring actual value switch	0 = Switch pushed 1 = Switch not pushed
E3	B69	Metering wheel / bale length sensor - signal B	Changes between 0 and 1 when metering wheel rotates
E4	B69	Metering wheel / bale length sensor - signal A	Changes between 0 and 1 when metering wheel rotates
E5	B23	Feed rake speed sensor (green) inside	1 = Plug removed Changes between 0 and 1 when feed rake rotates 0 = Wire ends connected
E6	B9	Drive speed sensor (red) outside	1 = Plug removed Changes between 0 and 1 when feed rake rotates 0 = Wire ends connected
E7	B24	Rotor speed sensor	1 = Plug removed Changes between 0 and 1 when feed rake rotates 0 = Wire ends connected
E8	B38	Crop humidity sensor	0 = Plug removed Changes between 0 and 1 when sensor OK 1 = Wire ends connected

Input testing, continued (on CCU module)
Continuity test

```
Service    RC                    8 / 2
w = + 2 0                    N 0 =      0
                             N 1 =      0
                             N 2 =      0

E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0          U : 1 1 , 6
F : 0 0 0 0 0 0 0 0            F F F F
```

```
1 2 3 4 5 6 7 8
```

The table below applies to page "8 / 2 (Service RC)"

Numeric character	Designation		Display
E1	None	Free	No function
E2	None	Free	No function
E3	Z56	Flywheel brake actual value switch	1 = Switch actuated 0 = Switch not actuated
E4	U1	Extend bale ejector cylinder switch (blue)	1 = Switch actuated 0 = Switch not actuated
E5	U2	Retract bale ejector cylinder switch (red)	1 = Switch actuated 0 = Switch not actuated
E6	B101	Bale discharge sensor	1 = Sheet metal in front of sensor 0 = No sheet metal in front of sensor
E7	None	Free	No function
E8	Z49	ROTOCUT knives ON actual value switch	0 = Switch actuated 1 = Switch not actuated

3.5   Output testing (on CCU module)
Testing the actuation by the modules

```
Service  1                        8 / 1
P =     0 L 0 , 0 0           N 0 =      0
P 0                  0           N 1 =      0
P 1                  0           N 2 =      0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0           U : 1 1 , 6
F :   0 0   0 0 0   0             F F F F
```

```
1 2 3 4 5 6 7 8
```

Eight numeric characters are available for output diagnosis in line "A" on page "8 / 1 (Service 1)" and page "8 / 2 (Service RC)", each of them being assigned to one circuit.
It must be ensured that the baling pressure solenoid valves (P0 and P1) are not activated. To achieve this, press the "Plus key" once.
The numeric characters only indicate if a solenoid valve is actuated by the corresponding module.
For diagnosis purposes, the corresponding function must be activated, i.e. the functions can be checked only one by one.
The numeric characters may assume the following values:

                0 = Solenoid valve is not actuated by the module or
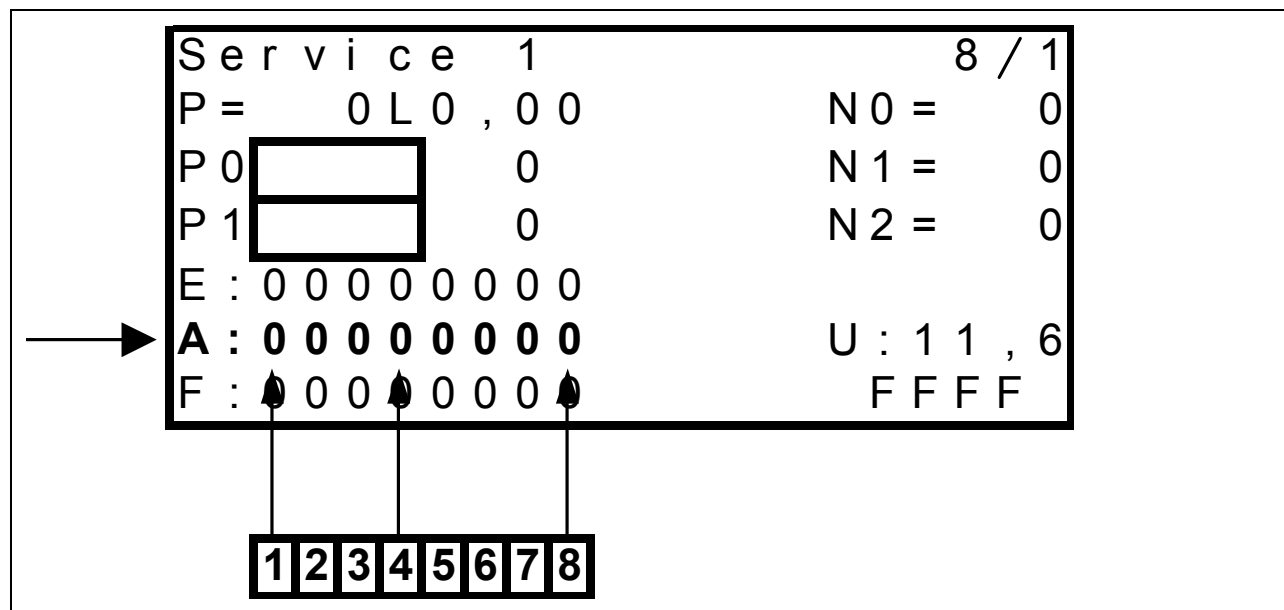   1 = Solenoid valve is actuated by the module.

Dependencies and switching sequences which may occur in normal operation have an influence.
The table below applies to page "8 / 1 (Service 1)"

Numeric character	Designation		Display
A1	Y63	Open cutting frame solenoid coil	0 = not activated 1 = activated
A2	Y64	Close cutting frame solenoid coil	0 = not activated 1 = activated
A3	Y54	ROTOCUT knives OFF solenoid coil	0 = not activated 1 = activated
A4	M25	Central lubrication system motor	0 = not activated 1 = activated
A5	Y11	Extend bale ejector cylinder solenoid coil	0 = not activated 1 = activated
A6	Y12	Retract bale ejector cylinder solenoid coil	0 = not activated 1 = activated
A7	Y58	Rotor blocking solenoid coil	0 = not activated 1 = activated
A8	Y77	Circulation shut-off valve solenoid coil	0 = not activated 1 = activated

Output testing, continued (on CCU module)
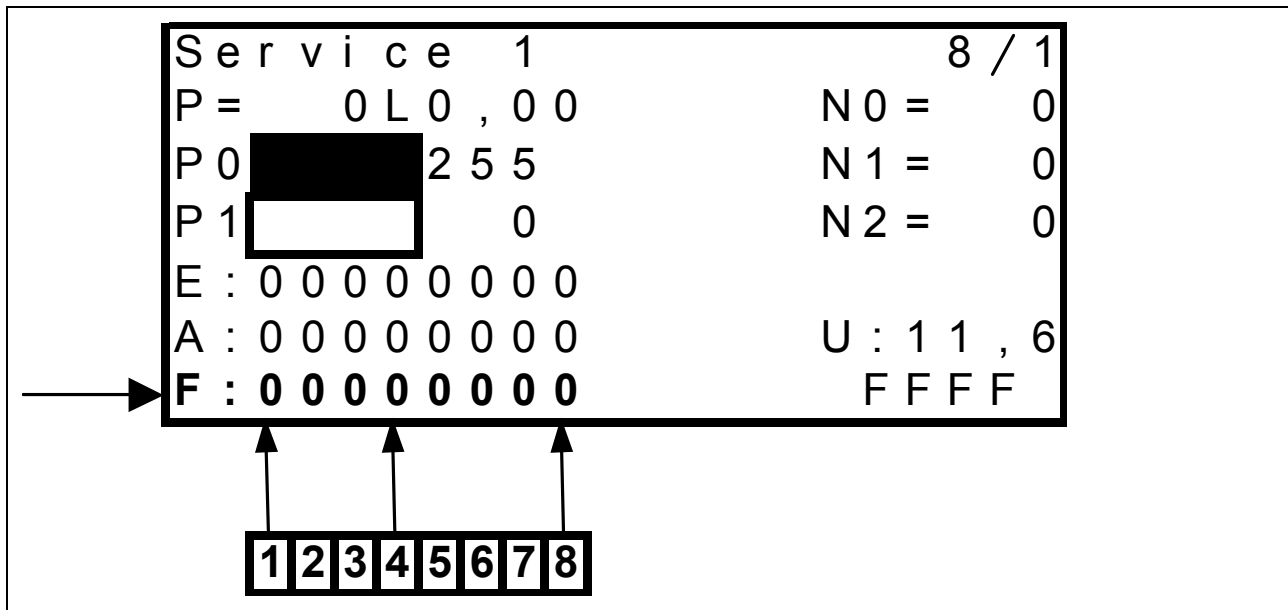**Testing the actuation by the modules**

```
S e r v i c e   1                    8 / 1
P =     0 L 0 , 0 0         N 0 =      0
P 0 ┌──────────┐  0         N 1 =      0
    │          │
P 1 └──────────┘  0         N 2 =      0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0         U : 1 1 , 6
F : █ 0 0 █ 0 0 0 █           F F F F

    1 2 3 4 5 6 7 8
```

The table below applies to page "8 / 2 (Service RC)"
For diagnosis purposes, the corresponding function must be activated, i.e. the functions can be checked only one by one.

Numeric character	Designation		Display
A1	None	Free	No function
A2	None	Free	No function
A3	None	Free	No function
A4	Y55	ROTOCUT knives ON solenoid coil	0 = not activated 1 = activated
A5	K92	Tying release motor relay	0 = not activated 1 = activated
A6	Y51	Baling pressure relief solenoid coil	0 = not activated 1 = activated
A7	Y50	Baling pressure build-up solenoid coil	0 = not activated 1 = activated
A8	Y31	Knotter cleaning solenoid coil (when set to 2.5 s blowing time)	0 = not activated 1 = activated

3.6   Error display (on CCU module)

```
S e r v i c e   1                        8 / 1
P =     0 L 0 , 0 0          N 0 =        0
P 0 █████   2 5 5            N 1 =        0
P 1 ░░░░░       0            N 2 =        0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0          U : 1 1 , 6
F : 0 0 0 0 0 0 0 0            F F F F
```

```
1 2 3 4 5 6 7 8
```

Eight numeric characters are available for error display in line "F", each of them being assigned to one error.
This function is available only on page 8/1 "Service 1".
The numeric characters may assume the following values:

    0 = No error or
    1 = Error.

All numeric characters show the respective state independently of each other. Dependencies and switching sequences which may occur in normal operation have no influence.

Numeric character	Reason	Remark	Symbol in work menu
F1	Cutting frame not closed	Cutting frame should be closed, but cutting frame position sensor indicates an angle above 0°	
F2	System fault (CAN bus)	No signal from CAN bus or module defective	
F3	Rotor overload	Drive speed above 500 rpm and rotor speed below 56 rpm	
F4	Feed rake overload	Drive speed above 500 rpm and feed rake speed below 60 rpm	
F5	Tying fault	See Electric System documentation Circuit diagram 11c (Tying fault sequence diagram)	
F6	Free	No function	
F7	Circulation shut-off valve activated too long	Circulation shut-off valve activated longer than allowed in connection with baling pressure build-up solenoid coil (more than 50 % actuated time within 3 min.)	
F8	Twine break	Twine break switch contact	
	Overload	$\Delta P > 15$ bars in 125 ms (module 3) $\Delta P > 20$ bars in 125 ms (module 4)	

3.7   Key test (on CCU module)

```
S e r v i c e   1                    8 / 1
P =      0 L 0 , 0 0        N 0 =      0
P 0 ████████ 2 5 5         N 1 =      0
P 1 ▭▭▭▭▭      0            N 2 =      0
E : 0 0 0 0 0 0 0 0
A : 0 0 0 0 0 0 0 0        U : 1 1 , 6
F : 0 0 0 0 0 0 0 0              F F F F ◄────────
```

```
1 2 3 4 5
```

Four numeric characters are available for key testing in line (1) shown above.

Pushing a key on the Control Terminal produces one of the combinations of numbers and characters shown below which allow checking the function.

The character "G" at the 5th digit indicates if the central lubrication system is currently active, otherwise this digit remains free.

Example: When the central lubrication system is active and the "Minus" key is pressed, the numeric characters read "FDFFG". If the central lubrication system is not active and the "Minus key" is pressed, the numeric characters read "FDFF".

Key	Designation	Display			
		1	2	3	4
▣	Scroll through main menu	E	F	F	F
▣	Scroll through second screen	D	F	F	F
↑	ROTOCUT knives ON	B	F	F	F
↓	ROTOCUT knives OFF	7	F	F	F
▤	Build up / relieve baling pressure	F	E	F	F
−	Minus	F	D	F	F
+	Plus	F	F	D	F
↑	Close cutting frame	F	B	F	F
↓	Open cutting frame	F	7	F	F
⟳	Manual tying	F	F	E	F
→	Right arrow key	F	F	B	F
←	Left arrow key	F	F	7	F

4.0   Additional information

4.1   Testing the baling pressure sensor (B56)
(with central terminal compartment)

To check the actual baling pressure, a pressure gauge must be connected to the measuring port of the baling chamber.
The pressure pre-set in the CCT should not deviate more than +/- 7 bar from the actual value.
During this test, the pressure sensor should transmit a signal voltage of approx. 1 V (0 bar baling pressure) and approx. 3V (220 bar baling pressure) which is proportional to the baling pressure to module 1.
For testing purposes, the voltage between module slot 2 (earth) and module slot 21 (signal from pressure sensor) can be checked on the plug of module 1 after removing the module.
If these values are not reached, the supply voltage of the pressure sensor should be checked.
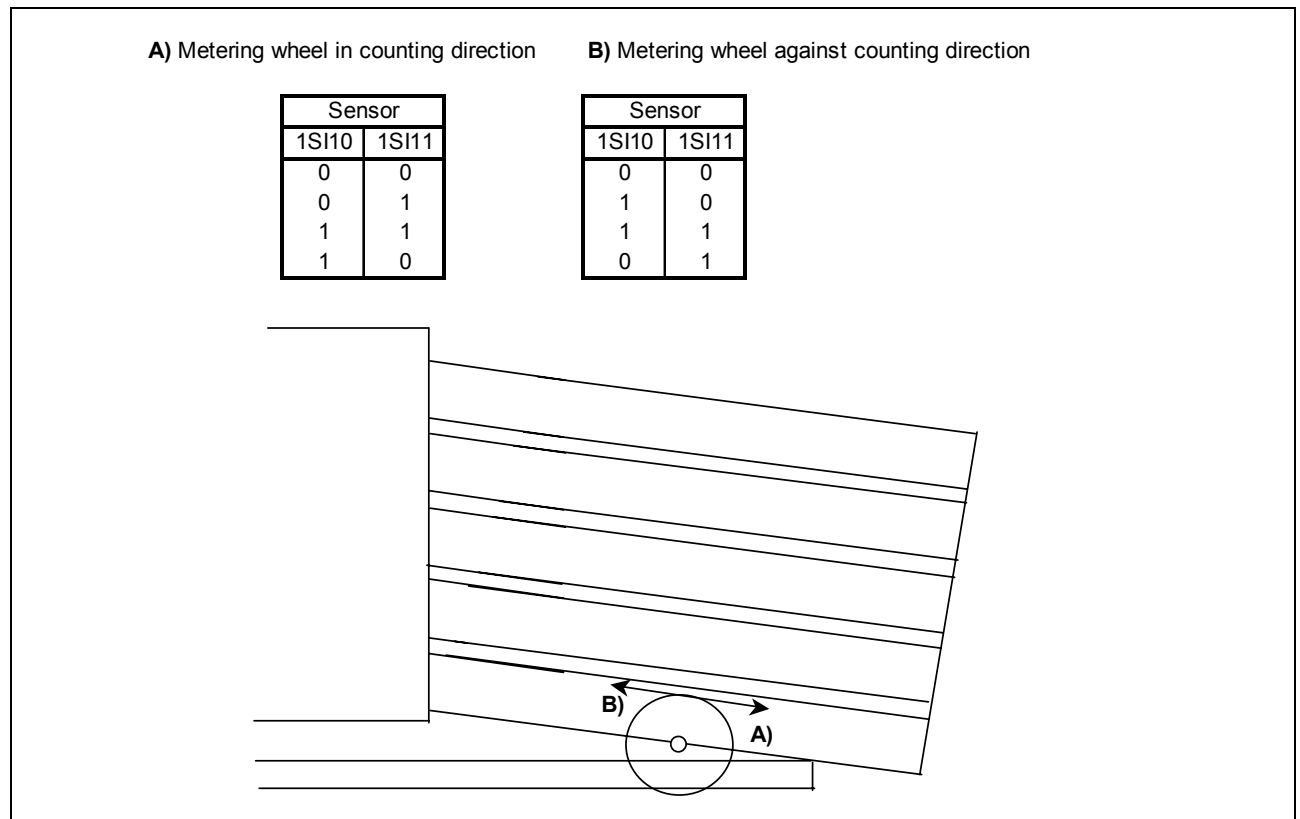This can be measured between module slot 1 and 3 of the plug on the baler side. The value should correspond with the system voltage of the tractor (approx. 12 V).

4.2 Testing the metering wheel / bale length sensor (B69)
(with central terminal compartment)

The service menu of the Control Terminal (see description in chapter 3.) can be used to check the metering wheel sensor.

The pulses of the metering wheel sensor can be tested individually in the service menu in the "Inputs" line. The numeric characters 7 and 8 change between "1" and "0" in a given pattern, which allows to identify the sense of rotation of the metering wheel.

To this end, slowly rotate the metering wheel and watch the display in the Control Terminal. The tables show an extract of the numeric character sequence which is repeated while the metering wheel rotates.

A) Metering wheel in counting direction   **B)** Metering wheel against counting direction

Sensor	
1SI10	1SI11
0	0
0	1
1	1
1	0

Sensor	
1SI10	1SI11
0	0
1	0
1	1
0	1

When the numeric character sequence is displayed in this order, the sensor is OK.

If the display does not change when the metering wheels is rotated, the cabling to the metering wheel sensor may be checked as follows:
1. When the plug has been removed from the metering wheel, both digits must show "0".
2. When pins 2 and 4 of the plug are connected, digit 7 must be "1".
3. When pins 3 and 4 of the plug are connected, digit 8 must be "1".
4. The tractor system voltage (approx. 12V) must be measured between pin 1 (power supply) and pin 4 (earth) of the plug on the metering wheel sensor.

In addition, a bale length of 1.28 m should be displayed after one rotation of the metering wheel (reset the display to zero by one tying process before this check).

The bale length is now displayed in the service menu under "L=".

If the length is not shown properly although the sensor and its cabling are faultless, the problem is in the program of the modules. In this case, the baler must be newly configured.

4.3   **General** (with central terminal compartment)

Ejecting bales	The bale length determined by the metering wheel when ejecting bales is saved in the baler module and added to the next bale later during baling. This value is stored even after switching off the ignition. The baling pressure is relieved when the bale is ejected.
Overload protection	When the maximum allowed ram force is exceeded, the baling pressure is abruptly relieved. This shuts down the baling pressure control for 7 seconds. After this, the pre-set baling pressure is built up again.
Knotter cleaning	The knotter is cleaned directly prior to tying the bale and after half the bale length has been reached.
Speed sensors	At a PTO shaft speed of approx. 350 rpm, the speed sensors (drive, feed rake, rotor) should display a correct value.
CCT	The full scope of electronic functions is available when: the main switch has been switched on for more than 3 seconds and the baler speed is at least 500 rpm.
Bale length display	When the bale length bar in the Control Terminal remains completely dark and when bale tying is not possible (e.g. by excessively fast rotation of the metering wheel by hand), the tying release must be reset. To do this, proceed as follows: 1. With the CCT switched on, turn back metering wheel until bar stops being dark 2. Wait for approx. 10 s 3. Switch CCT off / on.
Manual tying start	To be able to carry out a manual tying start on balers from machine no., the metering wheel must have measured a bale length of at least approx. 40 cm.

5.0   Information on replacing modules

A backup of the module data must be created using the CDS. To do this, start the corresponding program in the CDS.
The data are read out and saved on the CDS harddisk.

Disconnect the power supply of the machine **prior to replacing modules**.

After replacing the module, the data from the CDS must be restored to the machine.
Suitable programs are available in the diagnosis menu. This ensures that machine-specific data will not be modified.

Do not exchange modules between machines! There is no way to restore these data.

Notes

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Notes

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