Signal Mont s.r.o.
Kydlinovská 1300
HRADEC KRÁLOVÉ
Czech Republic
www.signalmont.cz

TECHNICAL CONDITIONS

TP SM HK 03/04

for electronic phase-sensitive receiver EFCP

intended as replacement of phase-sensitive relays of DSŠ12P, DSŠ12S and DSR12P, DSR12S type and for new devices

These technical conditions determine the basic technical characteristics of electronic phase-sensitive receiver EFCP, range and way of its testing, data relevant to delivery and conditions for its operation, as well as warranty and way of disposal after the end of his lifetime. They are binding on manufacturer t.j. Signal Mont s.r.o., Hradec Králové and product customers, who approved it or expressed agreement with it in other way.

On behalf of **Signal Mont s.r.o., Kydlinovská 1300, Hradec Králové** technical conditions are approved:		
Stamp	First and last name, function, sign	Date
	Jaromír Hádek director	
On behalf of **Starmon s.r.o., Nádražní 88, Choceň** technical conditions are agreed by:		
Stamp	First and last name, function, sign	Date
	Ing. František Starý director	

All references used in these technical conditions (TC), relating to standards TNŽ, ČSN and other related directives, are understood - if it isn't explicitly mentioned otherwise in standard - as amended by these standards, valid on the date of the last approval of these TCs or on the date of closure force of reffered-to standards, regardless of later changes or eventually vitiation of these standards. Clauses of standards, which the references reffer to, are considered for mandatory for purposes of these TCs.
These TCs are valid for the duration of production and for product life time from termination of production. Changes of these TCs, related with changes of product parameters, and pertinent completion of TCs will be done by producer after agreement with customer continuously for a period of their force.

I. Terminology and labeling

1. The terminology according to standards TNŽ 36 5530, ČSN EN 50125-3 and ČSN EN 50126 is valid for these TCs, if it is not specified otherwise.

Product labeling

2. Labeling used on product label means:
   - **E** **E**lectronic
   - **F** **F**ázově (Phase)
   - **C** **C**itlivý (Sensitive)
   - **P** **P**řijímač (Receiver)

Description

3. According to signal frequency distinction, the following variants are made (see annex 3):
   - for frequency of 75 Hz. It is intended as a replacement of DSŠ 12P and DSR 12P relays, used in track circuits with signal frequency of 75 Hz.
   - for frequency of 275 Hz. It is intended as a replacement of DSŠ 12S and DSR 12S relays, used in track circuits with signal frequency of 275 Hz.

Note: The distinction of design variant according to signal frequency is stated in Hz on the production label and the socket of each product.

4. According to construction design, the following variants are distinguished:

EFCP1 - var. j - 75 Hz (see [1] annex 3), var. l - 275 Hz (see [2] annex 3)

- This construction design is intended mainly as a replacement of DSŠ 12P,S relay
- It consists of two parts - the basic block and the socket 75069 5 130
- The basic block is formed by cassette of electronics and output NM 1- 2000 relay, located on basic board and is equipped with protection cover, which is, by default, used for DSŠ 12 relay
- NM 1- 2000 relay is located in top part and cassette of electronics at the lower part of basic block (at front view of element, set in operating position).
- All connecting points are brought-out on connectors, which are placed on the backside of the basic block
- The basic block is inserted into the socket 75069 5 130 – distinction (75 or 275 Hz) is made by placing of self-adhesive label on socket (see annex 2) during installation on-site

- The basic block is equipped with security lock with seal on the front protective cover against unauthorized intervention to the inner parts of the device

EFCP2 - var. i - 75 Hz, k - 275 Hz

- This construction design is intended mainly as a replacement of DSŠ 12P,S relay
- It consists of two parts - cassette of electronics (75069 5 260 - 75 Hz, 75069 5 261- 275 Hz) and the socket (75069 5 250, 75069 5 251)
- Only NMŠ 1-2000 relay can be the output relay. It is inserted into adapter on the socket (75069 5 250, 75069 5 251), so-called internal relay, or into the panel, so-called external relay (e.g. repeater of original relay DSŠ 12P,S).
- Cassette of electronics is equipped with separate protection cover and is put to the separate adapter, located on socket (cassette of electronics is at top and output relay NMŠ 1- 2000 is below, if it's used)
- Protection cover of cassette of electronics is equipped with security lock with seal against unauthorized intervention to the inner parts of the device

EFCP3 - var. a, b - 75 Hz, c, d - 275 Hz

- This construction design is intended mainly as a replacement of DSR 12P,S relay and for new systems
- It consist of the device cabinet, which is constructionally solved for placing on the shelf and includes equipment for 1 (var. a, c) or 2 (var. b, d) track circuits
- Required output relay NMŠ 1- 2000 (1 or 2 pcs) is not direct part of the device and it is placed separately to free coupling
- EFCP3 is equipped with security lock with self sealing tape against unauthorized intervention to the inner parts of the device

EFCP4 - var. e, f - 75 Hz, g, h - 275 Hz

- This construction design is intended mainly for newly built systems (inner design is the same as EFCP3)
- It consists of the device cabinet, which is constructionally solved for placing to the 19" container and includes equipment for 1 (var. e, g) or 2 (var. f, h) track circuits
- Required output relay NMŠ 1- 2000 (1 or 2 pcs) is not direct part of the device and it is placed separately to free coupling
- EFCP4 is equipped with security lock with self sealing tape against unauthorized intervention to the inner parts of the device

5. For supplements
6. For supplements
7. For supplements

II. Introduction

Function of element EFCP

8. The electronic phase-sensitive receiver EFCP is designed safe and highly reliable replacement of electromechanical phase-sensitive relay of DSŠ 12P,S, or DSR 12P,S type used in track circuits 75 Hz and 275 Hz. It is mainly based on elements and circuits principles, leading to the inherent safety of its particular functional blocks. For regulation of track circuits with these receivers, the authorized adjustment tables, intended for this equipment, are used.
9. Track phase voltage is brought through input isolation transformer on signal input of the phase detector FD, which works as one-way synchronous detector. The reference signal is brought

on control input of the synchronous detector. This signal is obtained from the local phase voltage. The part of reference voltage is also rectified to gain auxiliary dc voltage for power supply of all EFCP circuits.

10. Output voltage from the phase detector is brought through RC low-pass filter on input of level circuit with dynamic functional monitoring (comparator). It serves as converter of analog signal on two-state output signal that is used, after its rectification, to power up the reel of output electromechanical relay.

Installation and connection of element

11. Installation and connection of EFCP is different depending on its construction design.

12. EFCP1 variant (DSŠ cover):

    Original socket of relay DSŠ 12 is replaced by socket 75069 5 130. Fixation of this socket is then performed in the same way as original socket of relay DSŠ 12. Backside of the socket is equipped with clamps WAGO for connection of local and track phase inputs, lead-wires on contacts of the output relay and earth connection. Wiring of socket is reffered to annex 2.

13. EFCP2 variant:

    Original socket of relay DSŠ 12 is replaced by socket of EFCP2 (socket 75069 5 250, 75069 5 251). Fixation of this socket is then performed in the same way as original socket of relay DSŠ 12. The contact solder ribbons are brought-out on the back of socket for connection of local and track phase inputs. Leads to the contacts of internal output relay or terminals to the reel of external relay are connected directly on plug springs of small-size relay plug. The bolt M6 serves as earthing point.Wiring of socket is reffered to annex 2.

14. EFCP3 variant:

    This unit is intended for free standing on the shelf. It consists of the device cabinet, equipped with supply and one or two detectors. All the connecting positions are formed by connectors, accessible from backside of cabinet including point of earth connection (bolt M5).

15. EFCP4 variant:

    This unit is intended for installation to 19" container. It consists of the device cabinet, equipped with supply and one or two detectors. All the connecting positions are formed by connectors, accessible from backside of cabinet including point of earth connection (bolt M5).

16. The correct earth connection is necessary condition for correct operation of all mentioned variants of EFCP. This connection is carried out by earthing wire on appropriate clamp distribution frame WAGO for EFCP1, on bolt M6 for EFCP2 and on bolt M5 for EFCP3, 4. The EFCP cannot be operated without fulfilment of this condition.

17. The verification of reliable mechanical fixation of not only the device itself, but also of his partial parts as well as verification of electric wiring correctness has to be carried out before introduction of EFCP to the operation.

18. Installation and together operating position of EFCP1 or EFCP2 is given by operating position of output relay NM 1 - 2000 or NMŠ 1 - 2000.

    Note: The operating position of relay is horizontal (core axis), contacts upwards.

19. Security locks of EFCP have to be undamaged with identification signs of producer, eventually with identification signs of subcontractor of producer.

20. Assembly, eventually disassembly of EFCP can be done by staff at least competent (according to § 5, public notice 50/1978 Sb.) or persons competent in a word of public notice MD No. 100/1995 Sb.

21. For supplements
22. For supplements
23. For supplements

Documentation

24. The "Certification of quality and completeness of the product", "Certificate of warranty" and "Installation drawing" is supplied with every product. Technical description, instructions for design, installation and maintenance of EFCP - T75069 is supplied by producer on demand free of charge or the actual description can be obtained from www.signalmont.cz.
25. The following additional documentation can be ordered by special order, according to čl. 113:
    a) Technical conditions TP SM HK 03/04
    b) Technical description, instructions for design, installation and maintenance of EFCP T75069
    c) Instructions for testing and setup Z75069
    d) Approved adjustment tables for particular types of track circuits with electronic receiver EFCP

    Note: Documentation, according to point c) of čl. 25 of these TCs, is not provided by producer on a regular basis. It is intended only for usage in production or authorized services.
26. The TP SM HK 03/04 is also available in archive of technical central of Czech railways, Bělehradská 22, 120 00 Prague 2, or on their intranet pages in the section of conditioning documents register.

Technical requirements of order

27. The EFCP is supplied on the basis of written order. The following data have to be specified:
    a) design variant of EFCP and product number according to catalogue of producer (see annex 3),
    b) number of pieces,
    c) term of delivery and mode of withdrawal.

Spare parts

28. The list of spare parts supplied by producer is in annex 3.
29. The following data have to be specified in order of spare parts:
    a) product number and name of spare part of EFCP (see annex 3)
    b) number of pieces
    c) term of delivery and mode of withdrawal
30. For supplements
31. For supplements

III. Technical requirements

A. Introduction

32. The EFCP meets the requirements for safety of railway traffic in terms of ČSN EN 50129 with integrity level SIL 4.

33. EFCP is intended for use in the spaces of climatic class T1 (device cabinet) according to table 2 ČSN EN 50125-3.

34. All demountable connections of EFCP unit are secured against spontaneous release.

35. All wires and soldered connections inside EFCP1 have to be modified, in order not to be mechanically stressed at operational cycle of relay and themselves must not obstruct the movement of movable elements and contacts. Minimum distance of movable elements and contacts from other constructional parts of EFCP1 must be 3 mm, in harmony with provision of čl. 52, TNŽ 36 5530.

36. Protection against indirect contact in network of IT topology must be secured by operation in reserved electric workroom in accordance with čl. 413.1.5.8 Note A of ČSN 33 2000-4-41 and čl. 5.4, ČSN 34 2600.

37. Adjusted mechanical and electric parameters of output relay NMŠ 1 - 2000 (eventually NM 1-2000) have to be in harmony with technical conditions of producer DUO CZ, Ltd Opočno - TP 01- 98 a), eventually with directive ČD T 115/1 - „Repairs of exchangeable parts of signalling devices".

38. Setting, repair eventually cyclic checkup of EFCP1 with output relay NM 1 - 2000 can be done only by producer or subject, which was for this activity confirmed as qualified in accordance with provision in annex 1 and 2, directive ČD T 115.

39. Setting, repair eventually cyclic checkup of output relay NMŠ 1 - 2000, used in variants EFCP2, EFCP3 and EFCP4 can be done only by subject, which was for this activity confirmed as qualified in accordance with provision in annex 1 and 2, directive ČD T 115.

40. Reparation, revision and smoke test of unit EFCP, eventually cassette of electronics of EFCP, is provided by the producer, if the agreement with customer does not specify otherwise.

41. For supplements
42. For supplements
43. For supplements

Material

44. Used materials mustn't have any cracks or other functional and visual defects and must be stable all the mean technical lifetime of EFCP.

45. Used insulating materials have to conform to defined to the value of insulating resistance among live parts and earth for a period of mean technical lifetime (see point No.18 Table of electric and time parameters, annex 1 of these TCs). Measurement is carried out in accordance with čl. 89 of these TCs.

46. Protective plastic cover of EFCP 1 has to be dustproof and transparent in daily light, in order it is possible to carry out visual inspection of output relay. This condition has to be fulfilled all the mean technical lifetime.

47. Changes of materials and technology used for production of EFCP units are possible to only on fulfilment of condition:
    a) they will not be in conflict with provisions of obligatory standards,
    b) they will not have any negative influence on qualitative parameters given within the range of these TCs,
    c) they will not be in conflict with requirements of authority representing customer (producer familiarizes authority representing customer about intended changes yet before their implementation).

Surface treatment

48. Components of EFCP made from corroding materials are protected against corrosion. Protective layers mustn't adversely influence its functional characteristics.

49. Surface treatment of corroding materials corresponds with conditions for spaces of climatic class T1, according to table 2 and 3 of ČSN EN 50125-3.

Design

50. All parts of EFCP are made in accordance with valid drawings.

51. The mutual interchangeability of particular parts is warranted for EFCP2, 3 and 4 variants.

52. Prevention of possible interchange of both variants of EFCP1 or of both cassettes of electronics of EFCP2 is assured by clear description.

The identification of EFCP3 and EFCP4 variants is assured by the description on protection cover.

53. Operation of EFCP unit in system is indicated by LEDs as follows:

EFCP1 variant:	yellow LED	-	local phase
	green LED	-	output
EFCP2 variant:	yellow LED	-	local phase
	green LED	-	output
EFCP3 variant:	yellow LED	-	local phase
	1 green LED	-	output 1
	2 green LED	-	output 2
EFCP4 variant:	yellow LED	-	local phase
	1 green LED	-	output 1
	2 green LED	-	output 2

54. The outputs (contacts of relay NMŠ 1- 2000) for EFCP2 variant are available directly on socket of internal relay, if it is used. The 8 complete contact sets can be used.

55. For supplements
56. For supplements

B. Characteristics

Mechanical characteristics

57. Dimensions (w x h x d [mm]) and weight of EFCP variants:

EFCP1	outer dimensions (with socket)	134 x 192 x 251
	weight (with socket)	4,63 kg
	IP code	IP 50
EFCP2	outer dimensions	134 x 206 x 207
	weight	1,9 kg (without relay NMŠ 1-2000)
	IP code of cassette of electronics	IP 20
EFCP3	outer dimensions	165 x 115 x 226
	weight with 1 (2) outputs	2,1 (2,5) kg.
	IP code	IP 00 (open space of back cover)
EFCP4	outer dimensions	165 x 128,5 x 226
	weight with 1 (2) outputs	2,1 (2,5) kg.
	IP code	IP 00 (open space of back cover)

58. Design variant according to signal frequency has not influence either on contour dimensions or the weight of EFCP unit.

Electrical and time characteristics

59. Electric and time parameters measured under normal climatic conditions in operating position of EFCP unit have to correspond with parameters, reffered to in annex 1 of these TCs for all the mean technical lifetime.

60. Measurement of electric and time parameters of EFCP is carried out according to test and setup directive of producer.

61. Electric and time parameters mentioned in table of electric and time parameters, annex 1 of these TCs are obligatory for all design variants of EFCP.

62. For supplements
63. For supplements
64. For supplements
65. For supplements
66. For supplements

Electromagnetic compatibility

67. Product emissions:

    ČSN EN 61000- 6- 4 Values of clamp interference voltage and radiated field do not exceed limiting values for class A, given by ČSN EN 55011- Limits and measurement methods of electromagnetic interference from industrial facilities.

68. Product immunity:

    ČSN EN 61000-4-3 Radiated HF electromagnetic field in range of 80 ÷ 1000 MHz

    Track phase input:
    ČSN EN 61000-4-4 Impulse bursts with values ±1 kV, 5/50 ns (Tr/ Th), 5 kHz
    ČSN EN 61000-4-5 Surge with value 1,2/50 μs U a 8/20 μs I, ±1 kV

    Local phase input:
    ČSN EN 61000-4-4 Impulse bursts with values ±2 kV, 5/50 ns (Tr/ Th), 5 kHz
    ČSN EN 61000-4-5 Surge with value 1,2/50 μs U a 8/20 μs I, ±1 kV

Dependability

69. At fulfilment of all conditions specified for installation and operation of all construction and frequency variants of EFCP, the following is valid:

    a) mean time between failures (MTBF) 7 years,
    b) mean technical lifetime **Tž** 25 years

Permitted temperatures and warming

70. Softening temperature of used plastic and thermoplastic materials may not be lower than maximum allowed ambient temperature increased by maximum possible warming of parts, induced by normal operation of EFCP.

71. Operational surface temperature of EFCP parts, which can be source of heat, may not be higher than softening temperature of used thermoplastic materials.

72. Range of operational temperatures is -25 °C to +70 °C according to ČSN EN 50125-3.

Labeling of EFCP - product label

73. Every EFCP unit is equipped with product label, placed on well visible place. The product label mustn't inhibit the free view-through to the inner parts of output relay NM 1 - 2000 for EFCP1 unit.
74. Qualitative design of product label has to satisfy the provision of čl. 3.20, ČSN 34 2600.
75. The following data have to be specified on product label:
    a) name of producer,
    b) desing variant of EFCP,
    c) serial umber,
    d) vintage.
76. For EFCP1, the relay NM 1- 2000 is direct part of, there is below common cover visible also the product label (on relay armature) from the manufacturer DUO CZ, Ltd Opočno, which however isn't the product label of EFCP unit.

    Note – example of product label design of EFCP unit (EFCP2 variant, intended as direct replacement of relay DSŠ 12S, i.e. for signal frequency of 275 Hz):

Signal Mont s.r.o. Kydlinovská 1300 **HRADEC KRÁLOVÉ**	
EFCP 2- 275 Hz	
Serial umber	**0001**
Vintage	**2005**

IV. Instructions for production

77. Every newly made EFCP unit has to pass the smoke-test according to internal technological rule of producer SM HK No.8 and in harmony with test specification.
78. Only entirely non-corrosive soldering agents may be uses to soldering.
79. For supplements

V. Testing

A Introduction to testing

Type test

80. Type test is provided by the producer, in terms of ČSN 34 5608, on one piece of every design variant of EFCP. This test consists of all partial tests according to table 1.

    Note - Type test of EFCP1 and EFCP2 unit is performed including the socket.
81. The type test is provided by the producer in case of significant constructional or technological changes, which could affect the correct operation of EFCP.

82. The type test protocol is stored by producer and customer has possibility to look inside.
83. Separated type test is not performed for relay of NMŠ1- 2000 type.

Table 1- *List of partial tests*

Order	Test name:	Čl.:	Check test type:
1.	Design check	88	type-test
2.	Isolation resistance measurement	89	type-test
3.	Applied alternate voltage test	90	type-test
4.	Cold test	91	type-test
5.	Dry heat test	92	type-test
6.	EMC test	93	type-test
7.	Function test	94	type-test

Production check test

84. Production check single-part test is performed by the producer and its range is given in table 2 of these TCs. 100% of produced EFCP units of all variants has to undergo this test.
85. Measured values have to conform to values, given in table "Electrical and time parameters" in annex 1.
86. The production check test protocol is stored by producer and customer has right to look inside.

Table 2 *- List of partial tests:*

Order	Test name:	Čl.:	Check test type:
1.	Design check	88	single-part
2.	Isolation resistance measurement	89	single-part
3.	Applied alternate voltage test	90	single-part
4.	Function test	94	single-part

Acceptance tests

87. The čl. 99 to 106 of these TCs are valid for acceptance tests.

B Particular tests

Design check test

88. The general inspection is carried out.
    The general appearance, completeness product and harmony of design with production documentation is checked.

Isolation resistance measurement

89. Test 111 according to ČSN 34 5611 is performed as measurement between live parts and earth of device cabinet by dc voltage of 500 V (incl. socket for EFCP1 and EFCP2).

    Value of insulating resistance, read 1 min. after application of voltage, have to conform to the value of given in point No. 18 of the table of electrical and time parameters reffered to in annex 1 of these TCs.

Applied alternate voltage test

90. Test 112 according to ČSN 34 5611 (incl. socket for EFCP1 and EFCP2).
    The protective wire connecting PCB with frame is disconnected before measurement. The following measurements are done for a period of 1 min. (see *table of electrical and time parameters, annex 1 of these TCs*):

    a) The clamps of local phase input are paired to one node and clamps of track phase input (for EFCP3,4 inputs), output clamps (for EFCP1,2 contact sets, for EFCP3,4 clamps for connection of relay reels) and earthing clamp are paired to the second node. The voltage of 2,5 kV is applied mutually between these two nodes.

    b) The clamps of track phase input (for EFCP3,4 inputs) are paired to one node and clamps of local phase input, output clamps (for EFCP1,2 contact sets, for EFCP3,4 clamps for connection of relay reel) and earthing clamp are paired to the second node. The voltage of 4 kV is applied mutually between these two nodes.

    c) The output clamps (for EFCP1,2 contact sets, for EFCP3,4 clamps for connection of relay reels) are paired to one node and clamps of local and track phase input (for EFCP3,4 track phase inputs), and earthing clamp are paired to the second node. The voltage of 4 kV (for EFCP1,2) and the voltage of 500 V (for EFCP3,4) is applied mutually between these two nodes.

       Measurement is complying, if the defined test voltage is withstood for one minute. The breakdown or flashover must not occur during this time. Discharges, when the voltage does not decrease, are not considered to be defects.

Cold test

91. Test Ab 25/16 according to ČSN EN 60068-2-1- section 2 is performed.
    The EFCP is in operation from start of the test.

    Test is evaluated as complying, if unit will satisfy provision of čl. 94 of these TCs within the duration of entire test.

Dry heat test

92. Test Bb 70/16 according to ČSN EN 60068-2-2 is performed.
    The EFCP is in operation from start of the test.

    Test is evaluated as complying, if unit will satisfy provision of čl. 94 of these TCs within the duration of entire test.

EMC test

93. EMC test is performed according to requirements of ČSN EN 50121-4 tab. 3 and 4 − emissions and immunity (see čl.67 ÷ 69 of these TCs). The 230 V /75 Hz or 275 Hz voltage is connected on clamps of local phase (according signal frequency of EFCP variant) and the 50 V/75 Hz or 30 V/275 Hz voltage is connected on clamps of track phase. The output relay armature is picked up at this power supply, which is the base state.

    Product is complying, if it shows operation on base of criterion A or B, defined for given test.

Function test

94. Test procedure is stated in the Test and setting instructions of electronic phase-sensitive receiver EFCP.

    Product is complying, if it reaches the specified output parameters after startup (points 5 to 18 of annex 1, of these TCs) at meeting the conditions for input supply voltage (points 1 to 4 of annex 1, of these TCs).

Smoke test

95. Board of electronics is cycled (artificial ageing) in agreement with internal technological rule of producer SM HK No.8 in harmony with Test and setting instructions.

96. Assembled product undergoes the smoke test:
    a) for 8 hod. at temperature of -25 °C - the measurement of parameters is done according to test specification immediately after the test end,
    b) for 8 hod. at temperature of +70 °C - the measurement of parameters is done according to test specification immediately after the test end.

97. In case of any failure at smoke test, the whole smoke test cycle is repeated again after its elimination.

98. For supplements

VI. Acceptance, packaging, delivery, shipping, storage, guarantee period, service, maintenance and repairability, environmental compatibility

Acceptance

99. If it si not given by agreement otherwise, the representative of customer performs the acceptance at producer, which will provide him necessary instruments, tools, manpower and space.

100. At acceptance, the producer is obliged to submit the test reports of handed down units, further in accordance with requierement of acceptance body also all technological and constructional documentation.

101. Entire accepted delivery is submited to external inspection according to the point 1 of table 2. Any measurement of electric parameters is not performed during this inspection.

102. The 2 % or at least one EFCP unit of given production variant is submited to check in accordance with point 4 of table 2.

103. Entire accepted delivery is returned back, if even one EFCP unit disobliges within performed acceptance, according to čl. 101 and 102 of these TCs. The 4 % or at least two EFCP units are selected from repeatedly submitted delivery. If even in this case the delivery is not taken over by customer, the result of acceptance with statement of reason for dispproval of takeover is writen down to the protocol about acceptance. This protocol will be ratified by signature of the worker examining acceptance as well as responsible representative of the producer.

104. If the EFCP1 unit is subject of acceptance, the producer has to prove the defined characteristics of built-in relay of NM 1 - 2000 type, perhaps even name the maker, which performed the set-up. Representative of customer can, within acceptance, request the measurement records of this relay.

105. Protocol about performed acceptance is made out in two printed copies:
    a) first copy is for representative of customer,
    b) second copy is for producer.
106. For supplements
107. For supplements

Packaging

108. Every product EFCP is packed separately in firm cover and secured against movement.
109. The data about product are stated on cover and they are in harmony with description in čl. 75, points a) and b) of these TCs.
110. The cover is equipped with label for labelling fragile goods.

Delivery

111. EFCP (all production modifications) is supplied complete, certified and after it undertook the smoke test.
112. The documentation is supplied with every product in accordance with provision of čl. 24 of these TCs.
113. Order of device or documentation, carried out according to čl. 27 of these TCs, has to be sent on address:

    Starmon s.r.o
    Nádražní 88
    565 01 Choceň

Shipping

114. Transport of EFCP is carried out by covered vehicles, whereas devices can be stacked up to maximum 5 pcs., if the condition of proper locking against shift or fall is satisfied.
115. Transport means has to be covered in order the transported units were fully protected against weather influences.

Storage

116. EFCP must not be subject to impacts or shocks in storage spaces. Maximum stacking up to 5 pcs is admissible.
117. Units can be stored only in shipping covers, in order to be protected against dustiness, pollution and damage.
118. Units can be stored only in dry environment with temperature range from -25 °C to +35 °C and relative humidity up to 70 %.

Guarantee period

119. Producer provides the guarantee and is liable for delivered unit for a period of 24 months of the date of delivery. Necessary condition for provision of guarantee is compliance with conditions for storage and using of the unit.
120. Possible extension of guarantee period can be set individually on the basis of special contract.
121. The guarantee conditions for electronic products of Signal Mont Ltd. are enclosed to every EFCP unit.

122. If the unit failure is caused due to violation of operation parameters according to provision of these TCs, incompetent intervention or violation of conditions for transportation and storage, the claim on guarantee wears off.

123. Guarantee on delivered unit also wears off in case of violation of security locks, by which the unit is equipped in production.

Service

124. The spare parts, according to annex 3, are supplied by producer for all production variants of EFCP. In case of warranty and post-warranty repair work the EFCP has to be sent to manufacturer on address:

    Signal Mont, s.r.o - Customer service
    Kydlinovská 1300
    500 02 Hradec Králové 2

125. Necessary condition for claiming the rights for guarantee repair is submitting the certification of quality and completeness of product.

126. When sending EFCP to the repairs (handover of request on repair), it's necessary to mention:
    - place of deployment
    - when claiming the right for guarantee repair the certification of quality and completeness of the product has to be included
    - real time of operation
    - brief description of failure
    - correct address, incl. phone number of sender

127. Maintenance workplace of producer keeps a record about reparations with description of problem.

128. Producer passes on the evaluation of failure rate on demand of authority representing the customer.

Maintenance and repairability

129. The preventive maintenance is not carried out for EFCP2, EFCP3 and EFCP4 (except output relay).

130. Output relay NMŠ1-2000 is subject to standard mode of maintenance (including periodic checkups) according to rules of operator.

131. EFCP1 is subject to same mode of maintenance (including periodic checkups) as relay sets according to rules of operator.

Environmental compatibility

132. After termination of the product lifetime, the individual components turn to waste, structured according to the catalogue of wastes (public notice No.381/2001 Sb.) in accordance with Law of wastes (law No.185/2001 Sb.)

133. Classification of materials from product, intended to disposal

Table 3:

Product description	Code	Title	Category
Discarded PCBs etc.	20 01 36	Electrotechnical and electronic waste	O
Plastic waste	07 02 13	Plastic waste assorted, clean	O
Metal parts	17 04 05	Železo a ocel	O
Copper and brass parts	17 04 01	Copper, bronze, brass	O
Aluminium parts	17 04 02	Waste aluminium and its alloys	O

Note: O - waste of category other

134. The producer warrants the product withdrawal after termination of its lifetime back to disposal.

Related standards:

ČSN 33 2000-4-41	-	Electrical devices. Safety – protection against electrical shock (02/2000),
ČSN EN 60445 ed.2	-	Identification of equipment terminals (33 0160:05/01),
ČSN 34 2600	-	Electrical signalling systems (09/93),
ČSN 34 2613	-	Railway signalling systems – Track circuits and external conditions for their operation (10/1998),
ČSN 34 2614	-	Railway signalling systems – Rules for design, operation and use of track circuits (10/1998),
ČSN 34 5611	-	Electric tests of electrical devices (07/1971),
ČSN 34 2617	-	Determination and verification of indicators of dependability of railway signalling systems (12/92),
ČSN EN 60068-2-1	-	Environmental testing: Tests – Test A: Cold (34 5791:11/95),
ČSN EN 60068-2-2	-	Environmental testing: Tests - Test B: Dry heat (34 5791: 01/96),
ČSN EN 50121-4	-	Railway applications. Electromagnetic compatibility. Emission and immunity of the signalling and telecommunications apparatus (33 3590:06/01),
ČSN EN 50124	-	Railway applications. Insulation coordination.
ČSN EN 50125-3	-	Railway applications. Environmental conditions for equipment. Equipment for signalling and telecommunications ((33 3504:12/2003),
ČSN EN 50126	-	Railway applications. The specification and demonstration of reliability, availability, maintainability and safety (RAMS) (333502:2001),
ČSN EN 50129	-	Railway applications. Communication, signalling and processing systems. Safety related electronic systems for signalling (342675:01/04),
ČSN EN 55011	-	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment (33 4225:07/99),
ČSN EN 60529	-	Specification for degrees of protection provided by enclosures (IP code) (33 0330:11/93),
ČSN EN 61000-4-3	-	EMC: Testing and measurement techniques. Radiated, radio-frequency, electromagnetic field immunity test (33 3432:10/97),
ČSN EN 61000-4-4	-	EMC: Testing and measurement techniques. Electrical fast transient/burst immunity test. Basic EMC publication (33 3432:07/97),
ČSN EN 61000-4-5	-	EMC: Testing and measurement techniques — Surge immunity test (33 3432:07/97),
ČSN EN 61000-6-4	-	EMC: Emission standard for industrial environments (33 3432:08/02),
TNŽ 36 5530	-	Electrotechnic relays for railway signalling systems.

Completing of TP: Authors: Ing.Horák Karel, Ing.Šedivý Miloslav, Ing.Štorek Vladimír

Annex 1: Electrical and time parameters

	Electrical parameters	EFCP- 75 Hz	EFCP- 275 Hz
	power supply of electronic receiver (identical with voltage of local phase)		
1	nominal power supply voltage (identical with voltage of local phase)	230 V AC	230 V AC
2	power supply voltage tolerance	+ 10 %, - 14 %	+ 10 %, - 14 %
3	maximum power consumption – design with one (two) receiver	< 7 (10) VA	< 6,5 (8,5) VA
4	signal frequency	75 Hz	275 Hz
5	coeficient of receiver´s turn-off	min. 0,8	min. 0,8
6	coeficient of overload	min. 3	min. 3
7	track phase voltage for insured activity of receiver (in range of tolerance of local phase voltage and operational temperature)	30 V	14,5 V
8	track phase voltage for insured inactivity of receiver (in range of tolerance of local phase voltage and operational temperature)	24 V	11,6V
9	modulus of input impedance of track phase	2450 Ω ± 8%	800 Ω ± 8%
10	argument of input impedance of track phase	5º ± 2º	8º ± 2º
11	minimal modulus of input impedance of local phase - design with one (two) receiver (for minimal Um - row 1,2)	≥ 7,5 (5,5) kΩ	≥ 9,5 (7) kΩ
12	ideal phase angle between local and track phase	10º ± 3º	18º ± 3º

	Time parameters (output relay of NMŠ 1- 2000 or NM 1- 2000 type) - data are valid for variant EFCP 75 Hz and also 275 Hz:	**including relay (informative value)**	**only for electronics:**
13	**pick-up time -** interval between moment of TC clearing to moment of closure of all circuit-closing contacts of output relay.	< 0,6 s **	< 0,4 s***
14	**release time -** interval between moment of TC occupation to moment of opening of all circuit-closing contacts of output relay .	< 0,2 s **	< 0,1 s****
15	$\mathbf{t_{r1}}$ - maximum reaction time of TC receiver including drop of output relay *)	0,2 s **	
16	$\mathbf{t_{r2}}$ - minimum reaction time of TC receiver including drop of output relay *)	0,1 s **	
17	$\mathbf{t_{rk}}$ - reaction time of device for coding in station, given as interval between moment of TC occupation to moment of start of coding (according to annex U of ČSN 34 2614 is, for system coding in station, expected period t_{rk} about 70 ms longer than period t_{r1}, i.e. $t_{rk} = (t_{r1} + 0{,}07s)$) *)	0,27 s	
18	Isolation resistance between active parts and ground	min. 10 MΩ	

	Specific dielectric strength - data are valid for variant EFCP 75 Hz and also 275 Hz	
19	a) between inputs of local phase and other circuits with ground	2,5 kV 50 Hz/1min.
20	b) between inputs of track phase and other circuits with ground	4 kV 50 Hz/1min.
21	c) between outputs and both inputs with ground (for EFCP1,2 with relay) between outputs and all inputs with ground (for EFCP3,4 without relay)	4 kV 50 Hz/1min. 500 V 50 Hz/1min

*) Reaction time according to ČSN 34 2614

**) These times are based on typical measured values, becasuse they are not specified in technical conditions (TP 01 – 98 from 1.11.98) of manufacturer of relay, DUO Opočno.

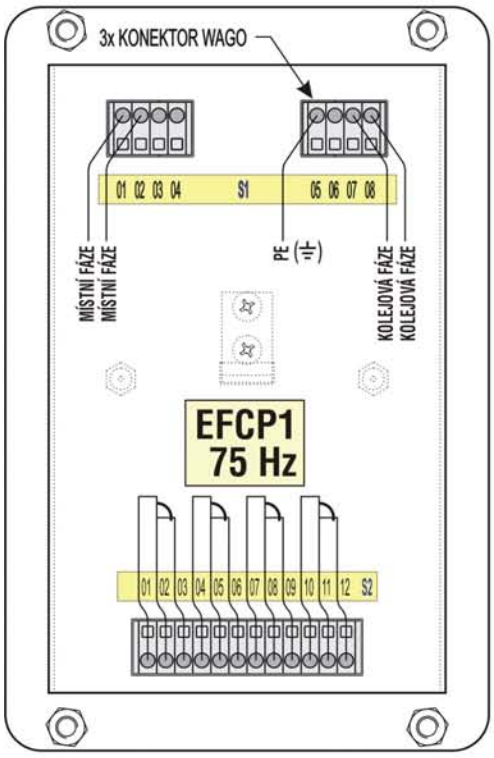
***) interval between moment of TC clearing to moment, when excitation coil voltage of NMŠ relay achieves guaranteed pick-up value of relay NMŠ (NM) 1 – 2000

****) interval between moment of TC occupation to moment, when excitation coil voltage of NMŠ relay achieves guaranteed drop voltage of relay NMŠ (NM) 1 – 2000

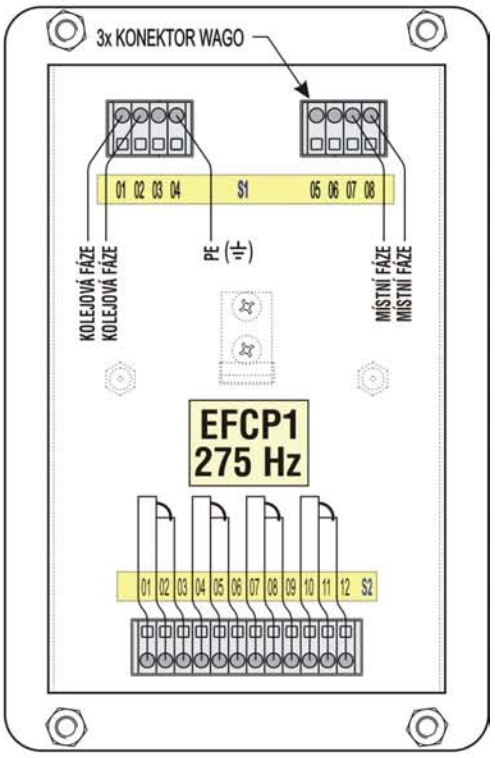
Annex 2 : View of sockets of EFCP1 and EFCP2 - rear view (from side of wiring)

ZAPOJENÍ PATICE 75069 5 130 (POHLED ZEZADU)

EFCP1 75Hz - 75069j

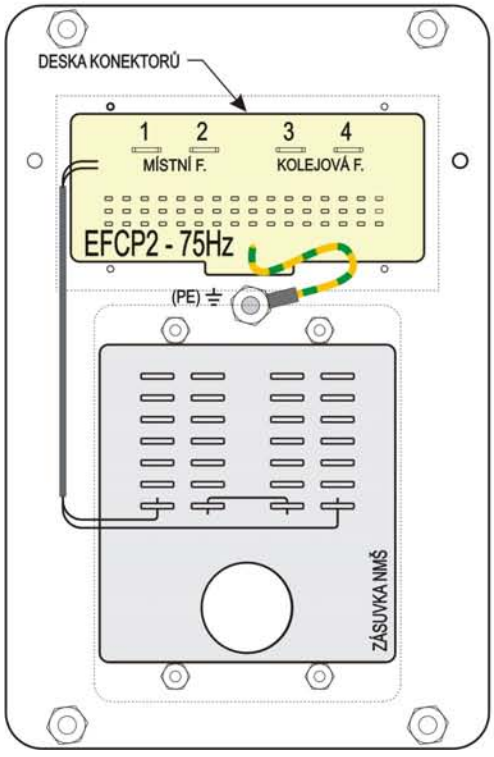


EFCP1 275Hz - 75069l



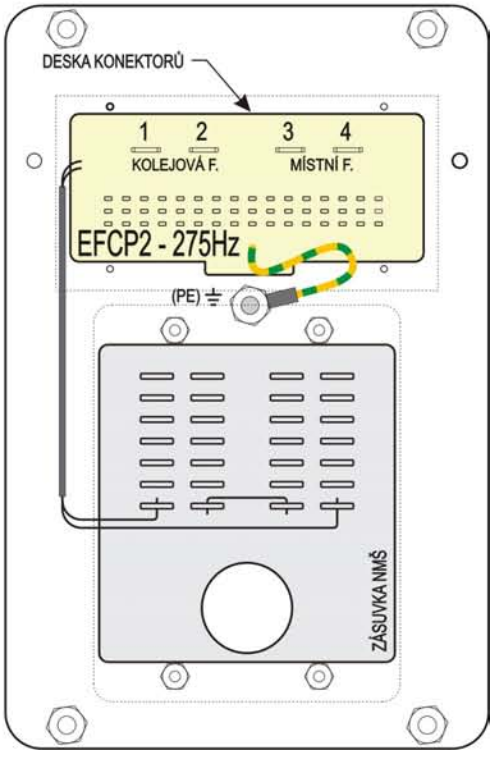
ZAPOJENÍ PATICE 75069 5 250 (POHLED ZEZADU)

EFCP2 75Hz - 75069i



ZAPOJENÍ PATICE 75069 5 251 (POHLED ZEZADU)

EFCP2 275Hz - 75069k



Annex 3: List of variants EFCP, supplied spare parts and their labeling

Production variants of EFCP

Product name - design	Trade product number	Note
EFCP1 - 75 Hz (Basic block + socket Ds130)	***75 069 j*** [1)]	**Complete set for replacement of relay DSŠ 12P**
EFCP1 - 275 Hz (Basic block + socket Ds130)	***75 069 l*** [2)]	**Complete set for replacement of relay DSŠ 12S**
EFCP2 - 75 Hz (electronic module Ds260 + socket Ds250)	***75 069 i***	**Set for replacement of relay DSŠ 12P (without relay NMŠ 1- 2000*)***
EFCP2 - 275 Hz (electronic module Ds261 + socket Ds251)	***75 069 k***	**Set for replacement of relay DSŠ 12S (without relay NMŠ 1- 2000*)***
EFCP3 - 75 Hz (device cabinet on nibs – equipment for 1 TC)	***75 069 a***	**Set for replacement of relay DSR 12P (without relay NMŠ 1- 2000*)***
EFCP3 - 75 Hz (device cabinet on nibs – equipment for 2 TCs)	***75 069 b***	**Set for replacement of 2pcs. of relays DSR 12P (without relay NMŠ 1- 2000*)***
EFCP3 - 275 Hz (device cabinet on nibs – equipment for 1 TC)	***75 069 c***	**Set for replacement of relay DSR 12S (without relay NMŠ 1- 2000*)***
EFCP3 - 275 Hz (device cabinet on nibs – equipment for 2 TCs)	***75 069 d***	**Set for replacement of 2pcs. of relays DSR 12S (without relay NMŠ 1- 2000*)***
EFCP4 - 75 Hz (device cabinet to 19“ container - equipment for 1 TC)	***75 069 e***	**For new equipment (without relay NMŠ 1- 2000*)***
EFCP4 - 75 Hz (device cabinet to 19“ container - equipment for 2 TCs)	***75 069 f***	**For new equipment (without relay NMŠ 1- 2000*)***
EFCP4 - 275 Hz (device cabinet to 19“ container - equipment for 1 TC)	***75 069 g***	**For new equipment (without relay NMŠ 1- 2000*)***
EFCP4 - 275 Hz (device cabinet to 19“ container - equipment for 2 TCs)	***75 069 h***	**For new equipment (without relay NMŠ 1- 2000*)***

Notes:
[1)] EFCP1 var. „**j**“ was for product numbers 1 to 5/04; 11 to 15/04 and 1 to 25/05 labeled as variant „**i**“

[2)] EFCP1 var. „**l**“was for product numbers 6 to 10/04; 16 to 20/04 and 26 to 50/05 labeled as variant „**k**“

List of supplied spare parts

Product name - design	Product number	Note
Socket EFCP1	***75 069 5 130***	
Basic block EFCP1 - 75 Hz	***75 069 5 100***	
Basic block EFCP1 - 275 Hz	***75 069 5 101***	
Socket EFCP2 - 75	***75 069 5 250***	
Socket EFCP2 - 275	***75 069 5 251***	
Electronic module of EFCP2 - 75 Hz	***75 069 5 260***	
Electronic module of EFCP2 - 275 Hz	***75 069 5 261***	
Power supply of EFCP 3,4	***75 069 5 011***	***Supplied only to authorized services (not separately sealed)***
Detector EFCP 3,4 - 75 Hz	***75 069 5 021***	
Detector EFCP 3,4 - 275 Hz	***75 069 5 022***	