

MICROELETRICA SCIENTIFICA
MILANO ITALY

Addendum Operation Manual IM30-DREK

Doc. N° MO-0105-ING

Rev. 0
Pag. 1 of 6

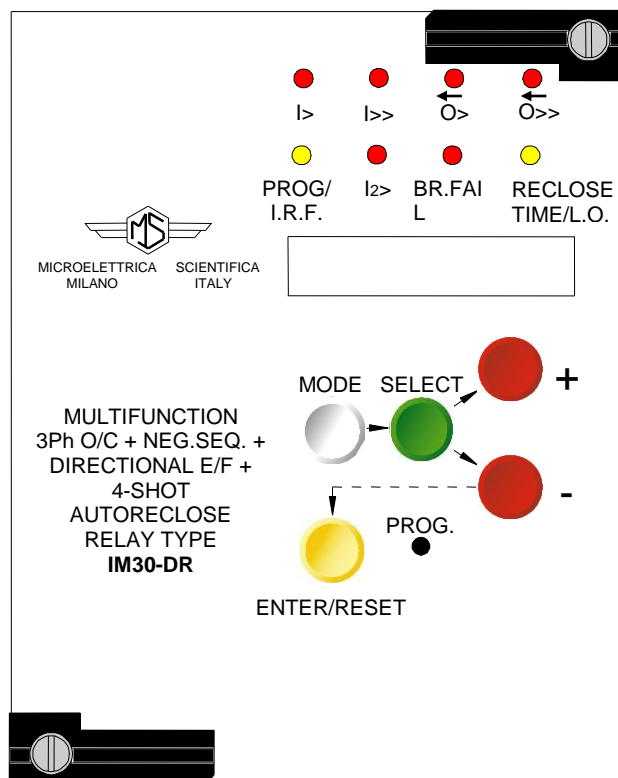
MICROPROCESSOR OVERCURRENT AND DIRECTIONAL EARTH FAULT PROTECTION RELAY + AUTORECLOSE

TYPE

IM30-DREK

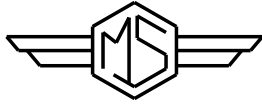
ADDENDUM

OPERATION MANUAL



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0	EMISSION	23/06/99	P. Brasca	D. Abad	
REV.	DESCRIPTION	DATE	PREP.	CONTR.	APPR.



MICROELETTRICA SCIENTIFICA
MILANO ITALY

Addendum Operation Manual IM30-DRE

Doc. N° MO-0105-ING

Rev. **0**
Pag. **2** of **6**

The Version K has been modified as hereunder listed

2. GENERAL CHARACTERISTICS

Input quantities are supplied to 1 Potential Transformer and to 4 Current Transformers (- three measuring phase current - one measuring the earth fault zero-sequence current). Rated current input can be 1 or 5A on phases and 1A on zero-sequence.

The zero sequence polarizing voltage input is rated 100V (from $V1: \sqrt{3}/(100:3)V$ open delta connected V.Ts.).

Make electric connection in conformity with the diagram reported on relay's enclosure.

Check that input currents are same as reported on the diagram and on the test certificate.

The auxiliary power is supplied by a built-in interchangeable module fully isolated and self protected

10. READING OF MEASUREMENTS AND RECORDED PARAMETERS

10.1 ACT.MEAS

Display	Description
Ioxxx.xA	As above, earth fault current.

10.2 MAX VAL

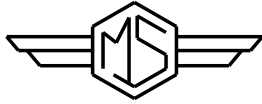
Display	Description
Ioxxx%On	As above, earth fault current.
Soxxx%On	As above, earth fault current.

10.3 EVENT RECORDING (LASTTRIP)

Display	Description
Ioxxx%On	Earth fault current.

12. PROGRAMMING

O> 1%On	Trip level of low-set earth fault element (p.u. of the rated current of the C.Ts. for zero sequence detection)	0.1 - 10 - Dis	0.1	%On
O>> 5%On	Trip level of high-set earth fault element (p.u. of the rated current of the C.Ts. for zero sequence detection)	0.1 - 10 - Dis	0.1	%On



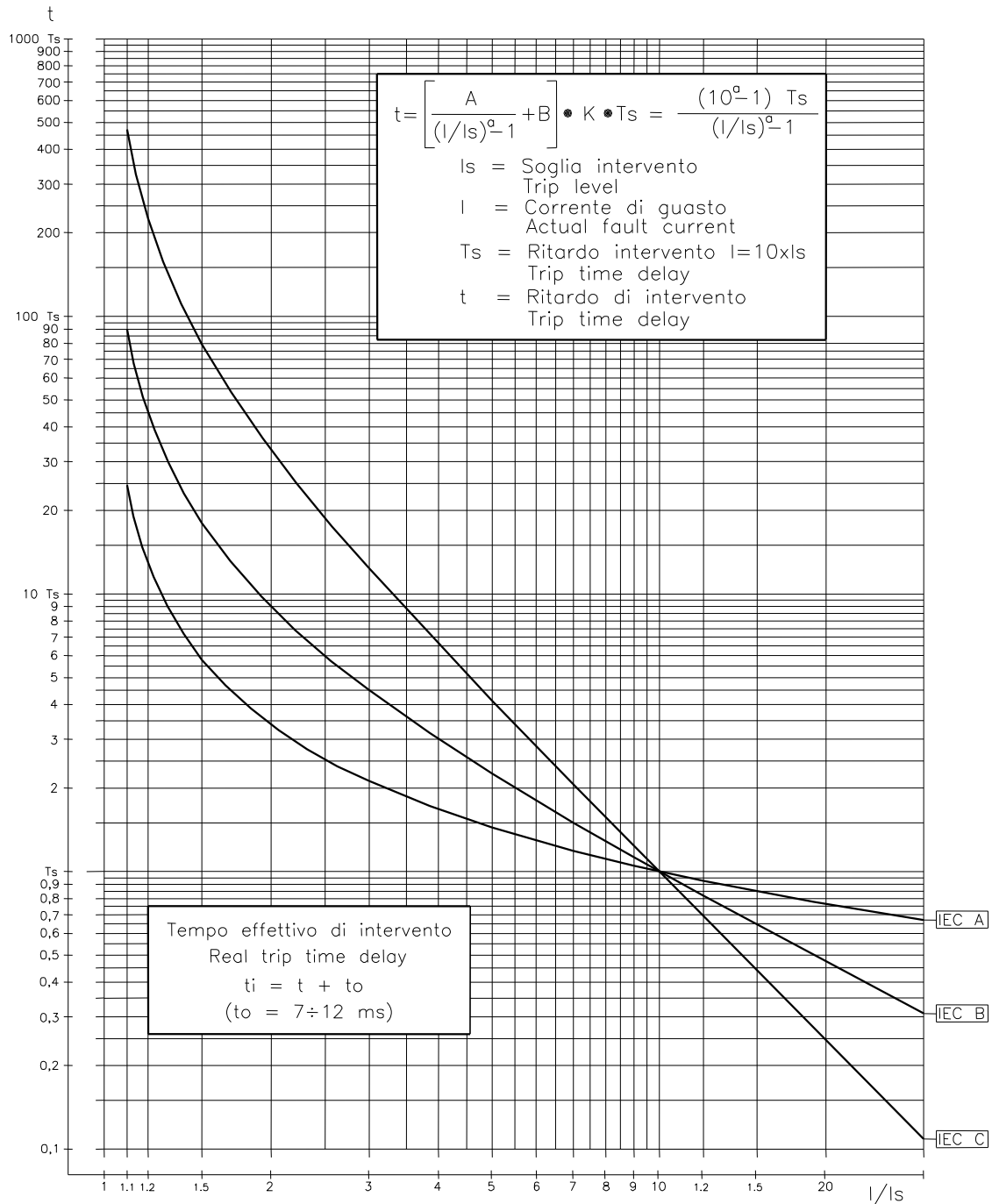
MICROELETTRICA SCIENTIFICA
MILANO ITALY

Addendum Operation Manual IM30-DRE

Doc. N° MO-0105-ING

Rev. **0**
Pag. **3** of **6**

20. TIME CURRENT CURVES (TU0353 Rev.0) 1/2

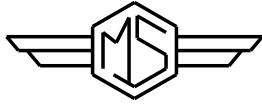


Curve Type	A	B	K	α
IEC A	0.14	0	0.336632	0.02
IEC B	13.5	0	0.666667	1
IEC C	80	0	1.2375	2

$$F51 \begin{cases} I_s = I > = (0.5-4)I_n \\ T_s = tI > = (0.05-30)s \end{cases}$$

$$F51N \begin{cases} I_s = I_0 > = (0.02-0.4)I_n \\ T_s = t_0 > = (0.05-30)s \end{cases}$$

For F51 saturation at $I > 50 I_n$
For F51N saturation at $I_0 > 20\%$



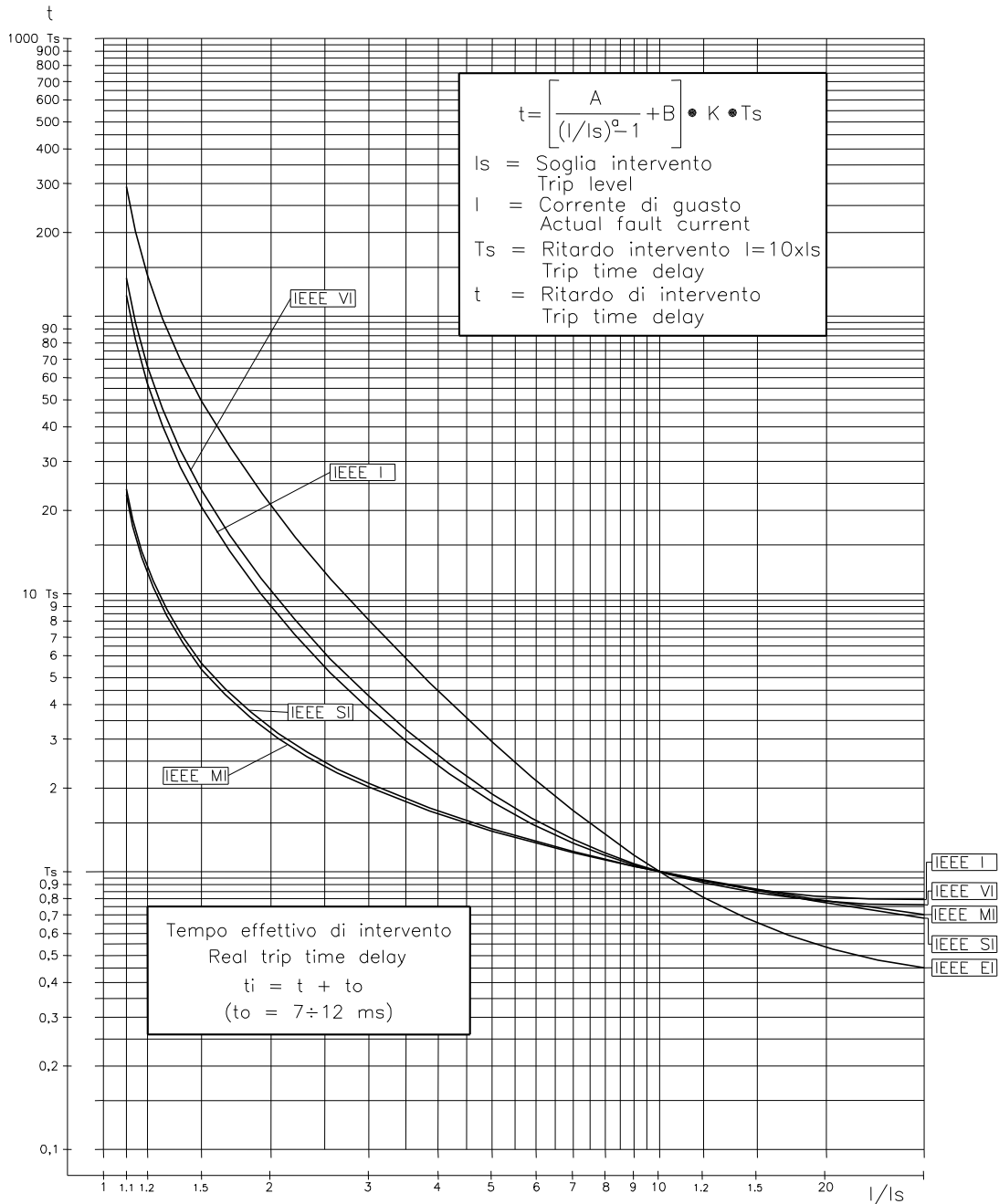
MICROELETRICA SCIENTIFICA
MILANO ITALY

Addendum Operation Manual IM30-DRE

Doc. N° MO-0105-ING

Rev. **0**
Pag. **4** of **6**

21. TIME CURRENT CURVES (TU0353 Rev.0) 2/2



Curve Type	A	B	K	a
MI=IEEE Moderate Inv.	0.0104	0.0226	4.110608	0.02
SI=IEEE Short Inv.	0.00342	0.00262	13.30009	0.02
VI=IEEE Very Inv.	3.88	0.0963	7.380514	2
I=IEEE Inverse	5.95	0.18	4.164914	2
EI=IEEE Extremely Inv.	5.67	0.0352	10.814	2

$$F51 \begin{cases} I_s = I > = (0.5-4)I_n \\ T_s = tI > = (0.05-30)s \end{cases}$$

$$F51N \begin{cases} I_s = 0 > = (0.02-0.4)0_n \\ T_s = t0 > = (0.05-30)s \end{cases}$$

For F51 saturation at $I > 50 I_n$
For F51N saturation at $I_o > 20\%$



MICROELETTRICA SCIENTIFICA
MILANO ITALY

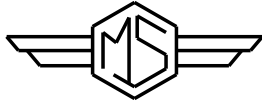
Addendum Operation Manual IM30-DRE

Doc. N° MO-0105-ING

Rev. 0
Pag. 5 of 6

24 SETTINGS' FORM

Date :		Number Relay:				
RELAY PROGRAMMING						
Default Setting			Actual Setting			
Variable	Value	Units	Description	Variable	Value	Units
xxxxxxx	DDMMYY	-	Current Date	xxxxxxx		-
xx:xx:x	HH:MM:SS	-	Current time	xx:xx:xx		-
x						
Fn	60	Hz	System Frequency	Fn		Hz
In	500	Ap	Rated primary current of the phase C.Ts.	In		Ap
On	500	Ap	Neutral CT rated primary current	On		Ap
F(I>)	D	-	Curve shape of low-set phase overcurrent	F(I>)		-
I>	1.0	In	Tap of phase low-set overcurrent elements	I>		In
tI>	2.0	s	Time dial of phase low-set overcurrent elements	tI>		s
I>>	2	In	Tap of phase high-set element	I>>		In
tI>>	1.0	s	Time delay of high-set phase overcurrent element	tI>>		s
2I>>	ON	-	Automatic Cold Load pick-up	2I>>		-
Uo	10	V	Enabling level of the zero-sequence polarizing input voltage	Uo		V
Fα	Dir	-	Operation mode of the earth fault element	Fα		-
α=	90	°	Max sensitivity direction of the earth fault current	α=		°
F(O>)	D	-	Curve shape of low-set ground overcurrent	F(O>)		-
O>	1	%On	Tap of low-set overcurrent ground element	O>		%On
tO>	4.0	s	Time dial of ground low-set overcurrent element	tO>		s
O>>	5	%On	Tap of high-set overcurrent ground element	O>>		%On
tO>>	3.0	s	Time delay of high-set ground overcurrent element	tO>>		s
F(I2)	D	-	Operation characteristic of the Negative Sequence element	F(I2)		-
I2	0.6	In	Tap of the negative sequence overcurrent element	I2		In
tI2>	2.0	s	Tap time delay of the negative sequence element	tI2>		s
1C	—I—O	-	Selection of the function(s) enabled to initiate the first reclosing	1C		-
2C	—i—oO	-	As above for second reclosing shot 2C	2C		-
3C	—o—oO	-	As above for third reclosing shot 3C	3C		-
4C	—I—O	-	As above for fourth reclosing shot 4C	4C		-
t1C	2	s	Reclosing time interval of first reclosing shot	t1C		s
t2C	4	s	As above for 2 nd reclosing shot	t2C		s
t3C	6	s	As above for 3 rd reclosing shot	t3C		s
t4C	8	s	As above for 4 th reclosing shot	t4C		s
tr	8	s	Reset interval after any successful reclosure	tr		s
LO#	3	-	Lock-out number	LO#		-
ChSet	2	-	Change Setting	ChSet		-
SEQ C	OFF	-	Sequence coordination with downstream recloser	SEQ C		-
tBF	0.25	s	Time delay for Breaker Failure alarm	tBF		s
B→I>	OFF	-	Blocking Input at terminals 1-2, blocks the timed output of the function I>	B→I>		-
B→I>>	OFF	-	As above, for function I>>	B→I>>		-
B→O>	OFF	-	As above, for function O>	B→O>		-
B→O>>	OFF	-	As above, for function O>>	B→O>>		-
B→I2	OFF	-	As above, for function I2>	B→I2		-
B→Rcl	OFF	-	Blocking Input at terminals 1-2, blocks the reclose function	B→Rcl		-
Tsyn	IRIG	m	Synchronization Time	Tsyn		m
NodAd	1	-	Communication address	NodAd		-



MICROELETTRICA SCIENTIFICA
MILANO ITALY

Addendum Operation Manual IM30-DRE

Doc. N° MO-0105-ING

Rev. **0**
Pag. **6** of **6**

CONFIGURATION OF OUTPUT RELAYS										
Default Setting					Actual Setting					
Protective Element	Output Relays				Description	Protective Element	Output Relays			
I>	-	-	-	-	Low-set phase overcurrent pick-up	I>				
tI>	1	-	-	-	Time delayed low-set phase overcurrent	tI>				
I>>	-	-	-	-	High-set phase overcurrent pick-up	I>>				
tI>>	-	2	-	-	Time delayed high-set phase overcurrent	tI>>				
O>	-	-	-	-	Low-set ground overcurrent pick-up	O>				
tO>	1	-	-	-	Time delayed low-set ground overcurrent	tO>				
O>>	-	-	-	-	High-set ground overcurrent pick-up	O>>				
tO>>	-	2	-	-	Time delayed high-set ground overcurrent	tO>>				
I2	-	-	-	-	Negative Sequence overcurrent pick-up	I2				
tI2	1	-	-	-	Time delayed Negative Sequence overcurrent	tI2				
C	-	-	-	4	Reclosure	C				
rLO	-	-	3	-	Reclose Lock-out status	rLO				
tBF	-	-	-	-	Breaker failure alarm	tBF				
BT	-	-	-	-	Breaker Trip relay	BT				
tFRes:	A				Relay reset mode A=Automatic, M=Manual (*)	tFRes:				

(*) For **C** and **rLO** reset remains anyhow automatic