

PULSE COUNTING SYSTEMS FOR CONTROL CENTRES

1. Purpose

It is felt highly desirable to equip the Control Centres with instrumentation capable of counting Magnet Pulses from a certain instant, with direct indication in digital form. The purpose of such a system would mainly be to give the various centres the necessary reference with respect to Machine Operation, to allow a sure comparison of measurements and displays obtained in different places. Let us consider, for example, the case of measurements of quantities taken with at least two different instruments, depending essentially on the number of particles per pulse. It is obvious that such measurements can only be compared if they have been taken in conjunction with the same pulse.

It is also evident that, because of the relatively short repetition rate of our machine, the automatic recording of the Magnet pulse number into pictures or films is essential.

2. Possible Schemes

From a general point of view, two types of circuits can be considered. Assuming that the source of information is always a pulse in the Power House which occurs every time the Magnet Current starts to rise, one has either :

- 1) A direct system, in which this pulse is sent to the counting devices at the receiving end.

In paragraph 3.1. (drawing 115-10-4) a practical scheme is described, based on the use of Sodeco Counters

or,

- 2) An indirect system, in which the pulses ^{are} first ~~transformed~~ ^{integrated} at the transmitting end, then distributed to the counting devices at the receiving end.

In paragraph 3.2 (Drawings 115-11-4 and 115-12-4) two practical solutions are described. The first one implies the use of an integrator, transforming the train of pulses into a stair-case voltage, the measuring device being essentially an analog digital converter. The second one uses decade selectors supplying indicating elements such as dekatron tubes. The pulse here is transformed into a constant voltage appearing in the different lines (one per figure and per decade).

2.1. Advantages and disadvantages

It is clear that in the case of 1) the advantage of overall simplicity, economy and reduced dimensions is accompanied by the disadvantage of miscounting of one or more indicating devices due to possible disconnections in the distribution system.

Another advantage of the system is the possibility of recording the number into Polaroid Pictures and Robot films (see paragraph 3).

The other one (2) is free from relative miscounting of some indicating elements with respect to others (either no indication or the same one) but it is more involved and it seems difficult, at present, to find an indicating device small enough for the purpose of recording mentioned above. However, it could provide a very reliable indication in each Control Centre (fairly sized sign in a strategic position).

The two systems can then be considered as complementary : The first one provides an economical way of distributing the Magnet Pulse number wherever necessary, especially for photographic recordings. The second one can be used to check the first one and only one indication, big enough to be seen from all the points of the room, can exist in each Control Centre.

3. Detailed Description

3.1. Direct system with Sodeco Counters

Drawings 115-10-4 shows the principle diagram of the system. The driving element is a contact in the Power House, which closes in conjunction with each Magnet Pulse. The driven elements are 5 digits Sodeco Counters (TCeF5E), all parallel to the same line, spread around each Control Centre.

- a) One reset button, by which all the counters can be reset to zero whenever convenient (e.g. at the beginning of a Machine session).
- b) The possibility of driving the system from one of the pulses of the Master Timer through an appropriate Pulse-Shaper Unit. This to have the possibility of operating the system when the Magnet is off and the Master Timer on simulation.
- c) The use of adaptors for easy mounting of the counters on to Dumont and Robot cameras for recording the number into the actual pictures. The cabling will be made in such a way as to avoid easy disconnecting of the counters from the distribution line.

3.2. Undirect systems

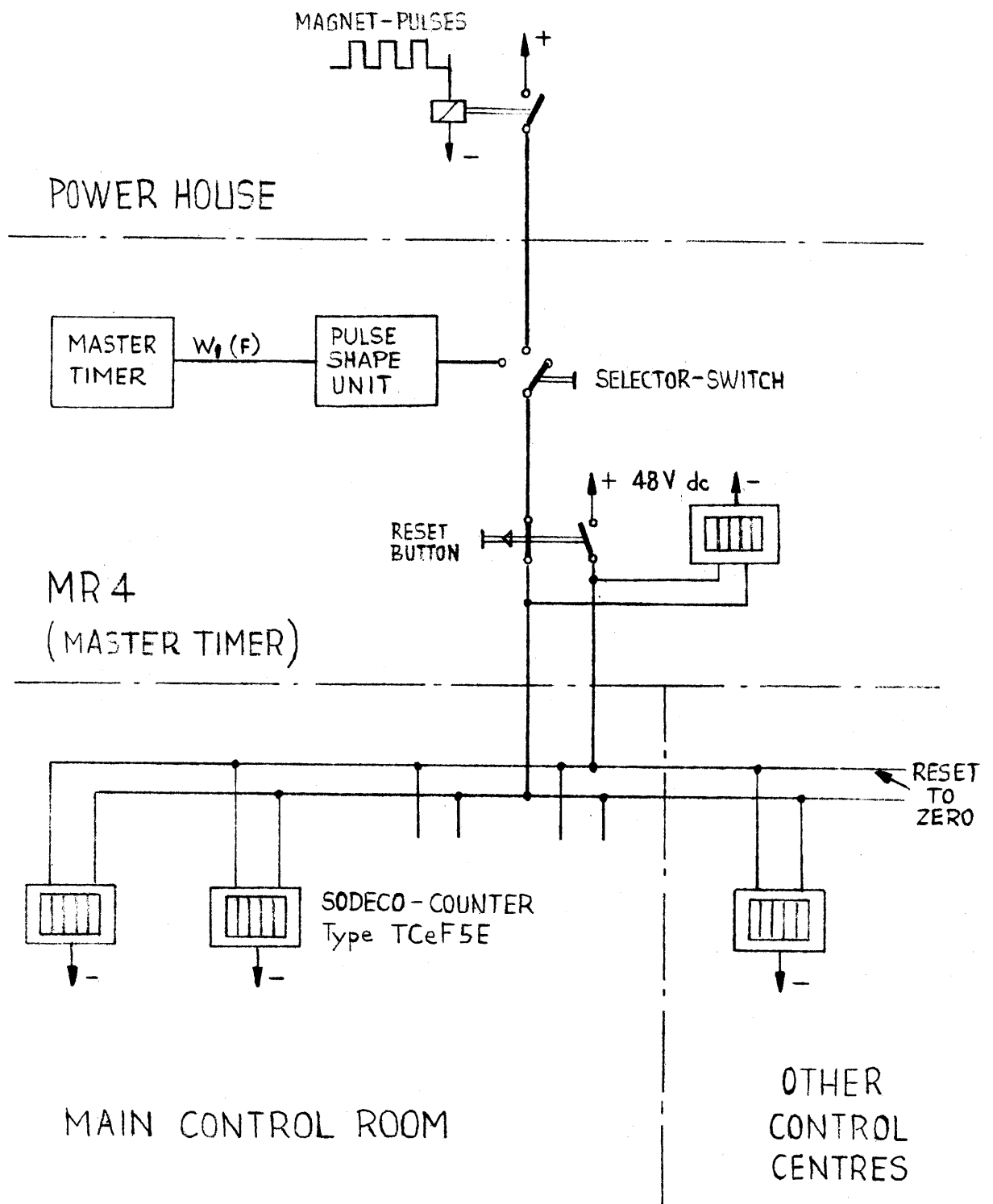
As already mentioned this system can be used as a check for the other one because of its intrinsic characteristics. However, it is conceivable that it can also be used as operational reference automatically recorded on, e.g., faults and disturbances recording equipment. The basic element to be chosen is the indicating device. Drawings 115-11-4 and 115-12-4 show two possible schemes, the first involving the use of an integrator and analog - digital converter and the second involving the use of Dekatron tubes driven by decade selectors.

The final choice will depend on the foreseen uses.

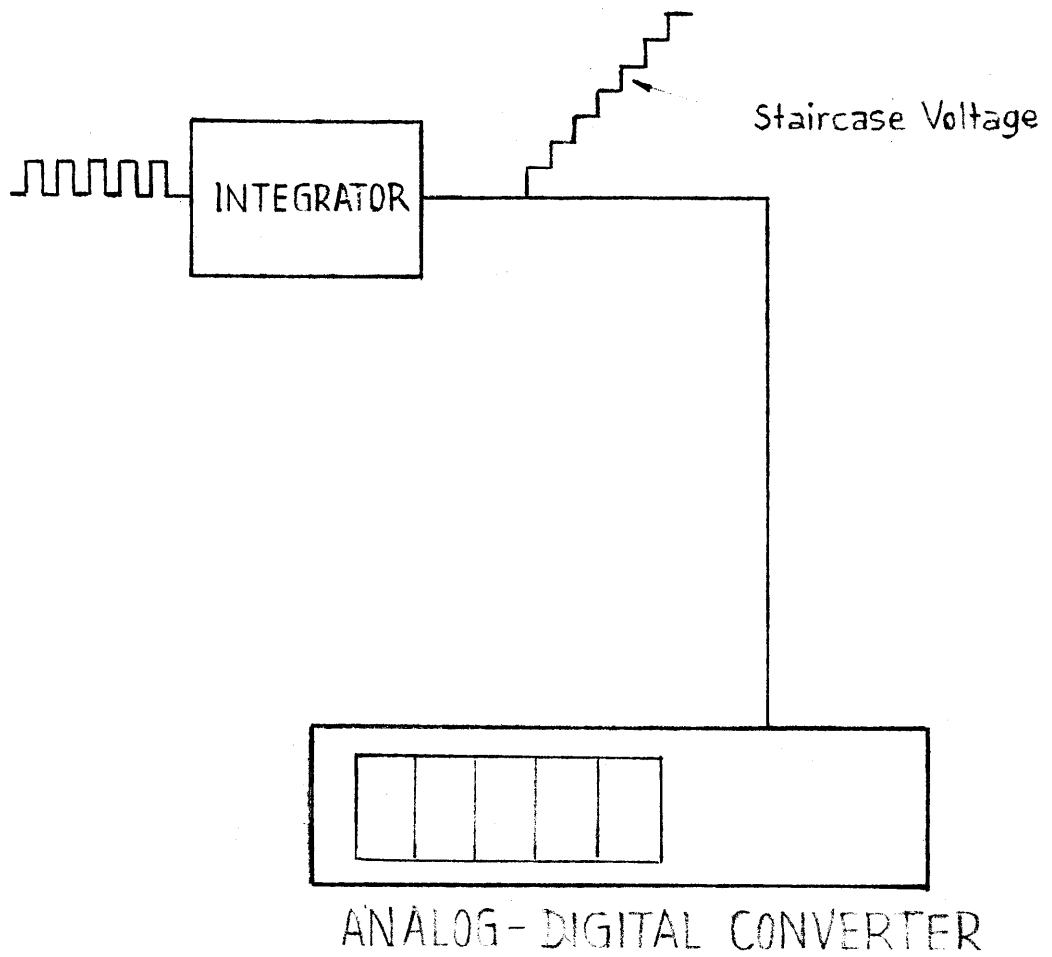
R. Mosig

Distribution (open) :

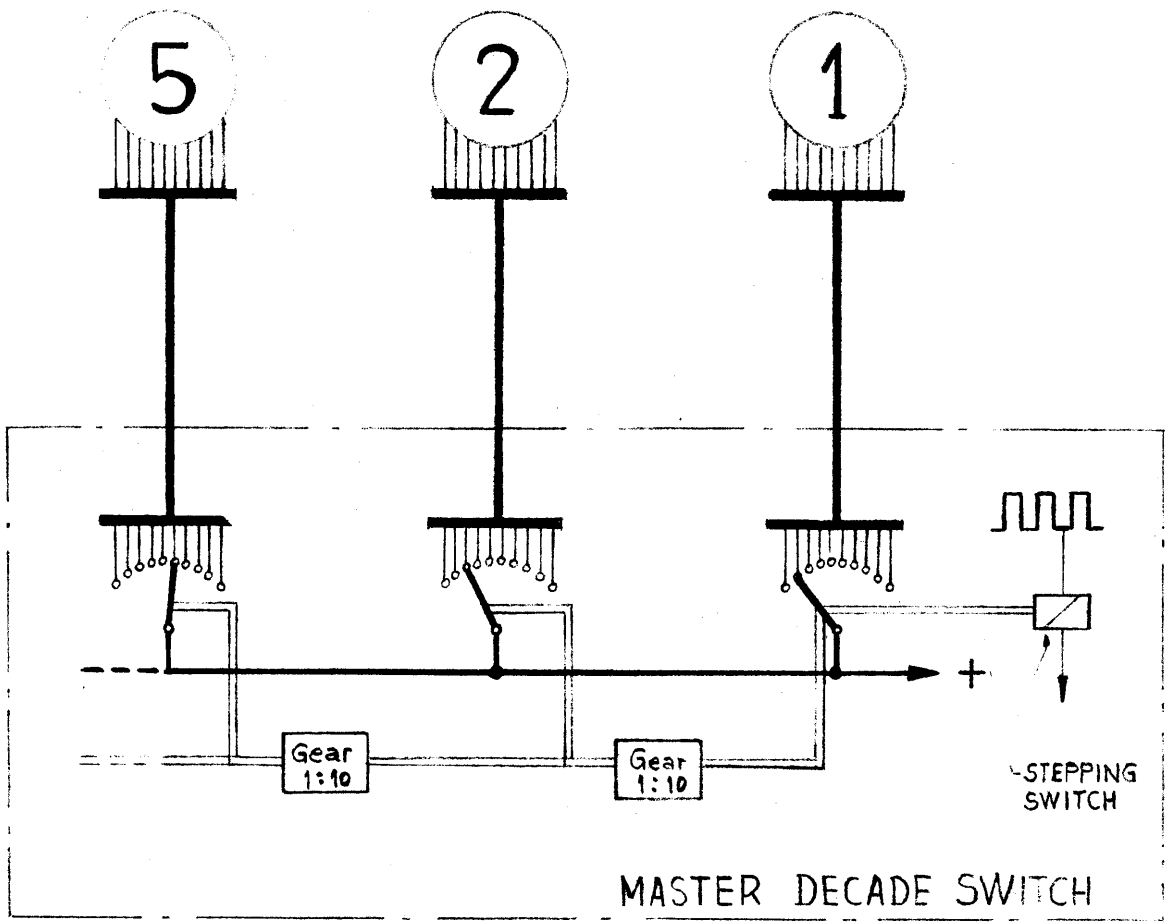
Parameter Committee		Mr. Mary	Mr. Sagnell
MOC and Assist.	Mr. Geibel	Mr. Mulder	Mr. Schnell
Controls Section	Mr. Geiger	Mr. van de Meer	Mr. Sharp
Mr. von Ballmoos	Mr. Hugl	Mr. Neet	Mr. Vaughan
Mr. Cheretakis	Mr. James	Mr. Nilsson	
Mr. Chuinart	Mr. Kuhn	Mr. Reitz	



Pos. Item	No. req. Nb. de p.	Descriptions	Material Matière	Pattern Modèle	Observations	
1	11					
2	12					
3	13	PULSE - COUNTING SYSTEM with Sodeco-Counters		Scale Echelle %	CERN-PS GENÈVE	
4	14					
5	15					
6	16					
7	17		Modifications			Signatures
8	18					9.10.59 <i>Liepfried</i>
9	19					
10	20				115-10-4	



Pos. Item	No. req. Nb. de p.	Descriptions	Material Matière	Pattern Modèle	Observations
1	11				
2	12				
3	13	PULSE-COUNTING SYSTEM with Analog-Digital Converter		Scale Echelle %	CERN-PS GENÈVE
4	14				
5	15				
6	16				
7	17	Modifications	Signatures		
8	18		9.10.59. [Signature]		115-11-4
9	19				
10	20				



Pos. Item	No. req. Nb. de p.	Descriptions	Material Matière	Pattern Modèle	Observations
1	11				
2	12				
3	13	PULSE-COUNTING SYSTEM with Dekatron Tubes		Scale Echelle %	CERN-PS GENÈVE
4	14				
5	15				
6	16				
7	17	Modifications	Signatures		115-12-4
8	18		9.10.59 <i>[Signature]</i>		
9	19				
10	20				